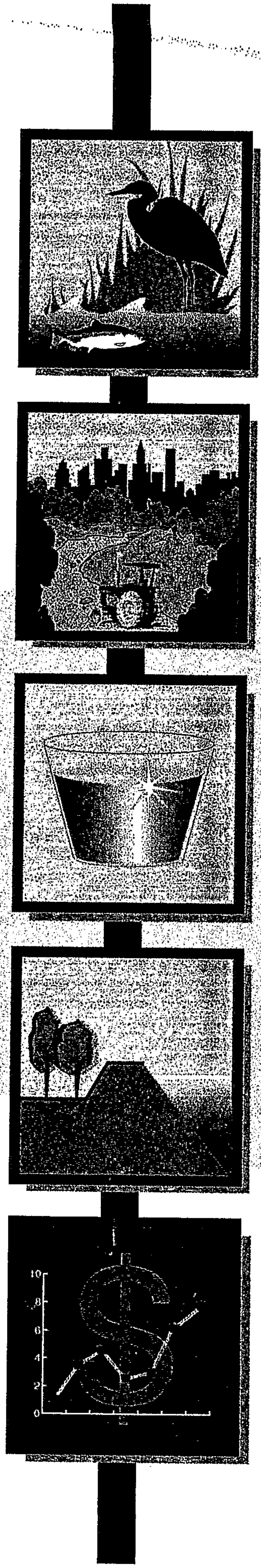

CALFED
BAY-DELTA
PROGRAM

Affected Environment and Environmental Impacts

Air Quality

Draft Technical Report
September 1997

CALFED/697

C-001787

Air Quality - Affected Environment

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1.0 SUMMARY

Existing air quality pollutant levels and regulatory structure for several air basins in the state of California were described to characterize the existing conditions of the CALFED study area. The CALFED study area encompasses at least a portion of nearly every air basin in the state, and so every region in the state was described for air quality conditions. Air quality pollutant levels are higher in urbanized areas near the most populated cities in the state, and in many cases, levels of ozone, carbon monoxide, and inhalable particulate matter exceed federal and State standards. Air quality levels in these areas have improved, however, over the last 10 to 15 years because of more stringent air quality regulations and controls, and improved vehicular fuels and emission controls. In the less populated areas of the state, air quality levels are typically low, and expect to remain low due to lack of significant population growth in the more rural areas (e.g., North Coast, Northeast Plateau, Mountain Counties).

2.0 INTRODUCTION

The purpose of this report is to describe the affected environment associated with air quality in the CALFED Project Region in support of the continuing CALFED Bay-Delta Program (CALFED) planning efforts and environmental documentation process. This is one in a series of preliminary reports that will be used with other information to develop the affected environment portion of the pending CALFED Programmatic Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

The CALFED Project Region includes the following air basins: 1) Northeast Plateau, 2) Sacramento Valley, 3) Lake County, 4) Mountain Counties, 5) San Francisco Bay Area, 6) San Joaquin Valley, and 7) Great Basin Valleys, 8) Central Coast Air Basin, 9) South Coast Air Basin, 10) San Diego Air Basin, 11) Mohave Desert Air Basin and 12) Salton Sea Air Basin. The "solution area" for the CALFED Bay-Delta Program includes the Delta region and other areas in California that may affect or be affected by potential CALFED actions. The air quality in several air basins located within the solution area, primarily those within the State Water Project Service Area outside the watershed will not be affected by this proposed project. There will be no construction or other activities located within these air basins to increase or decrease pollution emissions into the atmosphere. These air basins include, 1) Central Coast Air Basin, 2) South Coast Air Basin, 3) San Diego Air Basin, 4) Mohave Desert Air Basin, and the 5) Salton Sea Air Basin. No additional discussions for these basins is included.

The geographical focus of this report is the San Joaquin Valley, the Sacramento Valley, portions of the San Francisco Bay Area, and the Sierra Nevada foothills (including the Sacramento River Watershed Region and the San Joaquin River Watershed Region). This document is consistent with the goals of CALFED, the California Environmental Quality Act (CEQA), and the National Environmental Policy Act (NEPA) and reflects a level of detail appropriate for a programmatic approach to environmental review.

For purposes of the air quality assessment the five geographic regions are addressed in terms of the specific air basins within each region. The basins that coincide with each of the geographic regions are summarized below. In most cases each region only includes a portion of a specified air basin. Figure 1-6 illustrates the locations of each air basin with regard to each of the project related regions.

Delta Region

Sacramento Valley Air Basin
* San Joaquin Valley Air Basin
* San Francisco Bay Area Air Basin

Bay Region

San Francisco Bay Area Air Basin

Sacramento River Region

Sacramento Valley Air Basin
* Northeast Plateau Air Basin
* Lake Counties
* Mountain Counties

San Joaquin River Region

San Joaquin Valley Air Basin
* Mountain Counties Air Basin

CVP and SWP Service Areas outside the Central Valley

Sacramento Valley Air Basin
* North Coast Air Basin
* Northeast Plateau Air Basin
* Lake County Air Basin
* Mountain Counties Air Basin
* Great Basin Valleys Air Basin
* South Central Coast Air Basin
* South Coast Air Basin
* San Diego Air Basin

Mojave Desert Air Basin
Salton Sea Air Basin

This report discusses air pollutants of concern in the CALFED study area, including carbon monoxide (CO); ozone (O_3), which is formed by reactive organic gases (ROGs) and oxides of nitrogen (NO_x) in the presence of sunlight; and particulate matter smaller than 10 microns in diameter (PM_{10}). State and federal standards for these pollutants, as well trends of these pollutant levels in the study area, are described. Sulfur dioxide (SO_2) is not discussed in this report because it is emitted primarily by industrial sources and is not considered to be a pollutant of concern in the study area, which is in attainment with state and federal standards for sulfur dioxide. Regulations pertaining to air quality in the study area are also described.

Potential air quality impacts associated with CALFED include emissions generated by construction and operation of CALFED facilities, as well as dust and smoke from agricultural operations and power plant emissions that would result from changes in operation caused by potential CALFED actions.

3.0 SOURCES OF INFORMATION

The California Air Resources Board (ARB) Air Quality Trends report and report of area designations for State and national standards were used as sources of air quality pollutant levels and trends information (ARB 1995 and 1997, respectively). In addition, the ARB Emission Inventory 1993 was used to summarize air basin emission sources (ARB 1995). The National Climatic Data Center Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days for 1961-1990 (NCDC 1992) and the ARB Surface Wind Climatology (ARB 1984) was used for information on the climatology discussions.

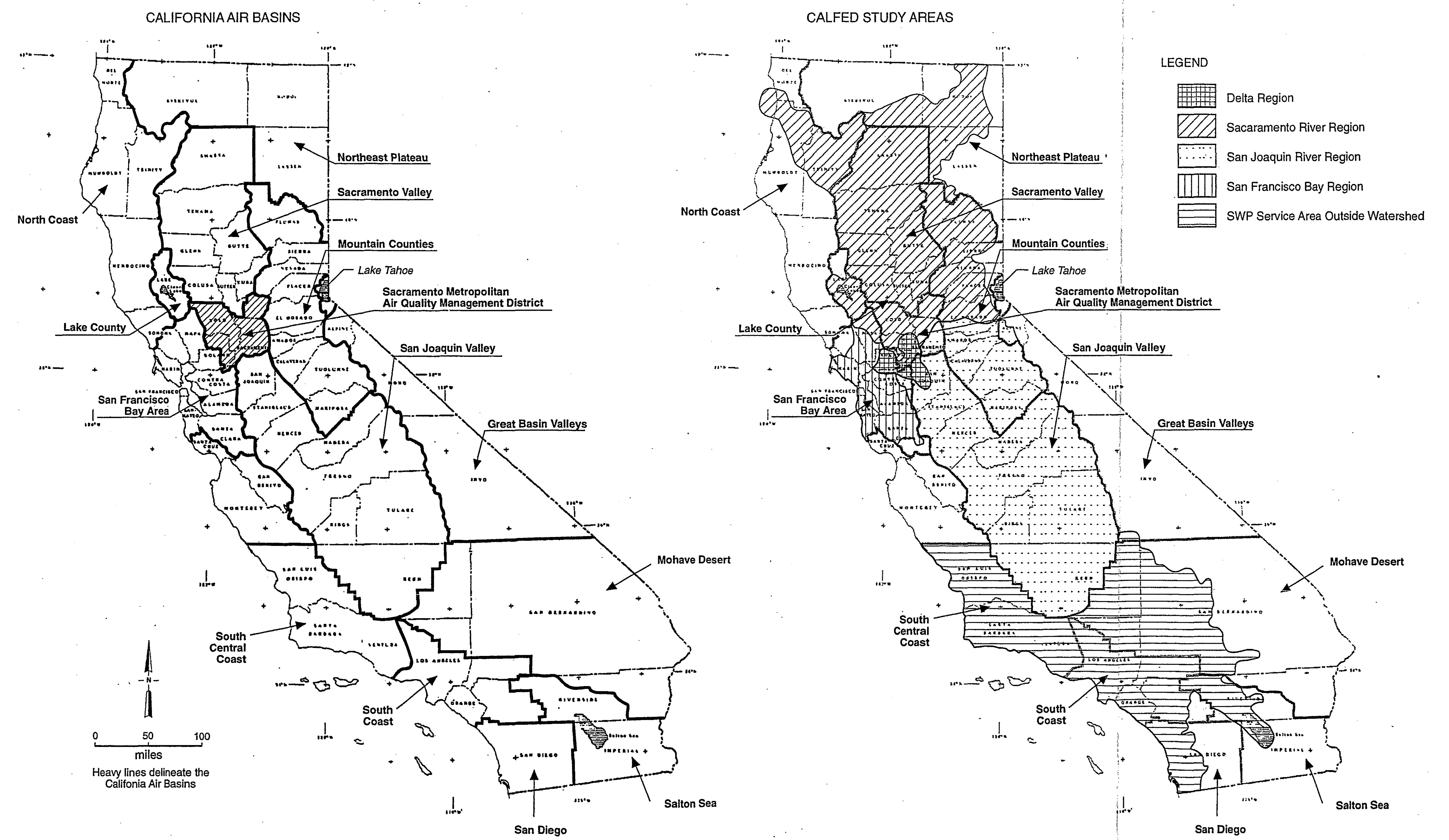
4.0 ENVIRONMENTAL SETTING

4.1 Study Area

The CALFED study area with respect to air quality includes portions of the North Coast Air Basin; portions of the Northeast Plateau Air Basin; the Sacramento Valley Air Basin (i.e., the northern portion of the Central Valley including the lower slopes of surrounding mountain ranges); the Lake County Air Basin; the Mountain Counties Air Basin; portions of the San Francisco Bay Area Air Basin; the San Joaquin Valley Air Basin (i.e., the southern portion of the Central Valley including the lower slopes of surrounding mountain ranges); portions of the Great Basin Valleys Air Basin; and portion of the South Central Coast, South Coast, San Diego, Mojave Desert, and Salton Sea air basins. Figure 1 shows the air basins in the CALFED study area.

4.2 Air Quality Problems By Ambient Standards

Ozone. Ozone is beneficial in the upper atmosphere because it serves it reduces harmful ultra-violet radiation, but in the lower atmosphere it is a respiratory irritant that impairs lung function, even in otherwise healthy but ozone-sensitive individuals. Its documented health effects are primarily



Project No. S9634	CALFED BAY-DELTA PROGRAM Air Quality Environmental Impact/ Consequences Technical Report	CALIFORNIA AIR BASINS AND CALFED STUDY AREA	Figure 1
Woodward-Clyde Consultants			

S9634-6600/082197/wcc/graphics/mci

C-001793

exceeds the 24-hour State standard on a regular basis. Visibility is often impaired in the Central Valley. In the San Joaquin Valley and Sacramento Metropolitan area, secondary particulate makes a more important contribution than in other areas.

Carbon Monoxide. The national and state standards for carbon monoxide are 9.0 ppm for an 8-hour average, and 35 ppm and 20 ppm respectively for a 1-hour averaging time. When carbon monoxide passes into the bloodstream in high concentrations it limits the ability of hemoglobin to carry oxygen to the heart and other organs of the body. In persons with heart disease, elevated levels of carbon monoxide can bring on angina and other symptoms of heart stress. The problem is aggravated for smokers and persons performing physical activities that elevate their heart rate.

High ambient levels of carbon monoxide have been associated with heavy concentrations of motor vehicles and cold stable air. Peaks typically occur in the winter, often on evenings or holidays. In some locations, extensive use of fireplaces or woodstoves can produce a significant contribution to elevated carbon monoxide levels, but in almost all cases motor vehicles are the overwhelming cause of problems.

The carbon monoxide problem in California has been improving quite steadily for twenty years and most experts consider the problem to be solved. In the last several years, exceedances of the more restrictive 8-hour standard have not occurred, even in congested urban areas. The improvement is due to better motor vehicle exhaust emission control systems and the use of oxygenated gasoline in the winter. Carbon monoxide is not a problem in the study area.

Sulfur Dioxide. There are federal 24-hour and annual average sulfur dioxide standards, and state standards for 24-hour and 1-hour averaging times. Sulfur dioxide impairs lung function particularly in asthmatics and others with respiratory problems. Sulfur dioxide is associated with the combustion of coal, petroleum coke and fuel oil, all of which are seldom used in California because natural gas has become the predominant industrial fuel. Where solid or liquid fuels containing sulfur are used, state or local regulations restrict either their sulfur content or require sulfur dioxide control devices. Sulfur dioxide levels do not approach national or state standards anywhere in the study area.

Nitrogen Dioxide. A national standard exists for an Annual Average and a State standard exists for a 1-hour averaging period. Nitrogen dioxide is a lung irritant that is particularly problematic to asthma sufferers. Nitrogen dioxide is emitted directly in any combustion process, but also can form in the atmosphere. Nitrogen oxide controls on vehicles and industrial sources, which are directed primarily at ozone reduction, have resulted in reduced levels of nitrogen dioxide as well. Nitrogen dioxide levels are well below standards throughout the study area.

Hazardous Air Pollutants. Hazardous air pollutants, often called toxic air contaminants, consist primarily of pollutants that increase cancer risk, though some are not short-term but ozone is also suspected of causing long term damage through chronic exposure, perhaps in combination with other pollutants. Ozone also causes damage to some man-made materials, and to many species of plants including valuable forest species and some commercial crops grown widely in California.

The current National ozone standard is 0.12 ppm for a one-hour averaging period. California has set a more stringent state standard at 0.09 ppm for one hour. The federal EPA is currently considering revising the national standard to make it more stringent.

Ozone in the lower atmosphere is formed by a series of complex photochemical reactions involving organic compounds (also referred to as "Ahydrocarbons," "Areactive" organic gases, or Avolatile organic gases and nitrogen oxides and occurring in the presence of sunlight. Ozone is highly reactive, so the chemical destruction of ozone is often taking place simultaneously with its formation. A given concentration of ozone can be formed over a variety of time periods and by a variety of chemical pathways, making strategies for control an inexact science. Elevated temperatures and stable atmospheric conditions enhance ozone formation, so ozone levels tend to be much higher in the summer.

Ozone control strategies in California have traditionally focused on reducing emissions of ozones chemical precursors, organic compounds and nitrogen oxides. Organic compounds can enter the atmosphere as a product of combustion or through evaporation; nitrogen oxides are produced almost solely through combustion. In some areas organic compound control is emphasized; in others both families of precursors are controlled. More recently, strategies have also involved slowing ozone formation by changing fuel composition and other products so that emissions of more reactive species of organic compounds are replaced with less reactive species. Motor vehicles of all kinds are the primary sources of precursor emissions, but industrial sources are also important. In recent years it has been recognized that in some areas, biogenic emissions of organic compounds from some species of plants can also contribute to ozone formation.

The severity of the ozone problem varies across the study area. The San Francisco Bay Area is the largest source area of precursor emissions for the region, but because of favorable meteorological conditions and a far-reaching control program, enjoys lower ozone levels than many other urban areas. Ozone precursors from the Bay Area are often transported through the Delta into the Central Valley and contribute to elevated ozone levels there. While ozone tends to be highest downwind of urban centers like Fresno, Merced. Stockton and Bakersfield, ozone levels exceed ambient standards throughout the San Joaquin Valley, which has the worst ozone problem of any part of the study area. In a typical summer, the San Joaquin Valley exceeds national standards more frequently than any area of the US, except for Los Angeles. Peak concentrations tend to be highest in the southern end of the Valley, which in the summer is downwind of most valley sources. In the northern half of the Central Valley, the Sacramento metropolitan area, including all or portions of

Sacramento, Yolo, Solano, and Placer Counties, has the highest ozone concentrations. Sacramento is also a source area for transported ozone and ozone precursors to the north, though peak ozone levels are lower in the northern half of the Central Valley. Along most of the eastern side of the Central Valley, ozone is transported from the valley floor into the foothills and upslope to high elevations in the Sierra. Along the western edge of the valley, ozone levels tend to be below standards, except for passes through which ozone and its precursors are transported from coastal areas.

Particulate Matter. The current national standards for particulate matter are 150 ug/m3 for a 24-hour average, and 50 ug/m3 as an annual average. California's standards for the same averaging periods are 50 ug/m3 and 30 ug/m3, respectively. The standards are measured as "PM_{10}," which is that fraction of suspended particulate in the air that measures less than 10 micrometers in diameter. It is this smaller fraction that tends to be more dangerous from a health perspective. Currently, the federal EPA is considering revising the national particulate standard to add a standard that applies to suspended particulate smaller than 2.5 micrometers.

Particulate matter is has been associated with a variety of health effects, the most important of which is an increase in mortality among people with severe respiratory problems. Both the size and chemical composition of particulate matter are important factors in the type and severity of health effects, but the relative importance of these factors is not fully understood. In addition to problems caused by their physical presence in lung airways and passages, some particulate matter carries species of known or suspected carcinogens into the lungs. In addition to health effects, particulate matter can cause soiling and impair visibility. Airborne particulate matter is the most complex air pollution problem in the study area. A typical 24-hour particulate sample might contain soil particles, combustion ash or soot, salts, metals, particles of man-made materials like automobile tires, and various species of secondary particulate that formed chemically in the atmosphere from precursor gases and aerosols. The relative contribution of these components will vary by location, time of year and weather conditions. Because there are so many sources of airborne particulate, effective control strategies are difficult to develop. Fortunately, the control strategies for some other pollutants can also reduce particulate matter. The control of ozone precursors for example, also reduces the formation of secondary particulate, specifically organic aerosols and nitrates. Past control programs that have resulted in widespread use of cleaner fuels such as reformulated gasoline, reformulated Diesel fuel, and natural gas, have reduced directly emitted and secondary particulate matter. Particulate control devices on industrial stacks and vents, open burning restrictions, dust suppression at construction sites, and housekeeping activities such as street sweeping all serve to reduce directly emitted particulate matter.

The particulate problem in the study area varies by location and season as is described below. Areas of the San Joaquin Valley exceed the federal 24-hour standard on some days, and virtually the entire study area carcinogens but pose other risks. With the exception of lead, there are no national or state ambient air quality standards for hazardous air pollutants, but they are controlled by source category based on their identification as a health hazard. Most hazardous air pollutant problems are very localized because they are associated with specific sources. Some of the most ubiquitous are benzene, 1,3 butadiene, and components of diesel exhaust, all of which are emitted by motor vehicles. A few, such as asbestos, may be naturally occurring and could be produced by project construction activities in the study area.

Other Pollutants. With concerns for global climate change and depletion of the ozone layer in the stratosphere have come concern with the emission of other pollutants. Among these are carbon dioxide from fossil fuel use, methane and ammonia from certain agricultural practices, and the release of chloroflorocarbons from a variety of industrial and commercial activities. These problems are global in nature and are not expected to be any more of an issue in the study area than in any other area. They are mentioned here for completeness.

4.3 Regulatory Context

Agency Responsibilities

Air quality management in California is governed by the federal and California Clean Air Acts and the California Health and Safety Code. The U.S. Environmental Protection Agency (EPA) oversees implementation of the federal Clean Air Act. ARB, a department of the California Environmental Protection Agency (Cal-EPA), oversees air quality planning and control throughout California and regulates directly emitted mobile-source pollutants and fuel content. ARB divides the State into air basins based on meteorological and geographical conditions and, to the extent feasible, political boundaries. Within each air basin, individual air quality management agencies or air pollution control districts oversee individual source permitting and manage nuisance complaints from the public.

Air Quality Management Programs

State. The California Clean Air Act requires that an air quality attainment plan be prepared for areas that violate air quality standards for CO, SO_2, nitrogen dioxide (NO_2), or O_3. The air quality attainment plan requirements established by the California Clean Air Act are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution control districts are required to establish and implement emission control programs commensurate with the extent of pollutant transported to downwind districts.

Federal. The federal Clean Air Act mandated the establishment of ambient air quality standards and requires areas that violate these standards to prepare and implement plans (State Implementation Plans [SIPs]) to achieve them. A separate SIP must be prepared for each nonattainment pollutant. Individual air quality management agencies throughout the State are responsible for preparing and submitting air quality attainment plans to ARB for criteria pollutants for which their respective air basins, or portions of air basins, are not in attainment. ARB then reviews these plans and forwards them, combined collectively as the SIP, to EPA Region IX for approval. Table 1 shows federal and State ambient air quality standards for pollutants of concern.

Conformity. Projects involving federal funding or federal approval are required to show conformity with the 1990 amendments to the federal Clean Air Act (Section 176) and EPA's general conformity rule if they would result in emissions exceeding certain threshold levels. These pollutant threshold levels, called "*de minimis*" emissions levels, vary from pollutant to pollutant and depend on the federal attainment status of individual air basins. The various de minimis levels are listed in the federal conformity rule (40 CFR 51.853). As discussed above, pollutants for which portions of the study area are in nonattainment of federal standards are CO, O_3, and PM_{10}; therefore, if any proposed CALFED action would result in the emission of an amount of any pollutant that exceeds a de minimis threshold in any of the study area air basins, a conformity analysis and statement of conformity with the Clean Air Act by the responsible federal agency would be required for that action.

4.4 Existing Resources and Conditions

Climate and Meteorological Conditions

Climate and meteorological conditions, air quality standards, monitoring data, and emissions inventory information are described below for each air basin in the study area.

North Coast. Summers in the North Coast air basin are mild in the daytime and cool at night, and the climate dry with little rainfall in the late spring and summer months. Winter days are mild, with cold nights. The greatest amount of rainfall occurs between the months of November and March. The predominant wind direction is northwesterly throughout the year, except for in the winter when winds change with the passage of storms.

Northeast Plateau. The northeast plateau climate is that of a high desert, with warm days and cool nights in the summer, and cool days and cold nights in winter. Most of the precipitation falls between the months of November and April, with snow at the higher elevations in the winter. However, annual precipitation amounts are low due to a rainshadow effect east of the mountains. Winds are influenced by the mountains to the west and are predominantly northeasterly in the winter, westerly in the spring and summer, and southwesterly in the fall.

Sacramento Valley Air Basin. The climate of the Sacramento Valley Air Basin (SVAB) generally consists of hot summers and cool, rainy winters. Approximately 90% of the rainfall occurs between November and April, with little or no precipitation occurring from late spring to early fall. Prevailing winds are usually oriented along the major axis of the Sacramento Valley, following a southeast-northwest pattern.

During summer, the Pacific high-pressure system isolates the entire SVAB from storms and creates inversion layers in the Valley. These inversion layers prevent the vertical dispersion of air; topographic barriers prevent lateral dispersion. As a result of

Table 1
CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY

Pollutant	Averaging Time	California Air Quality Standards	Federal Primary Standards
Oxidants (Ozone)	1 hr	0.09 ppm	0.12 ppm
Carbon Monoxide	1 hr 8 hrs	20 ppm 9.0 ppm	35 ppm 9 ppm
Nitrogen Dioxide	1 hr Annual	0.25 ppm --	-- 0.053 ppm
Sulfur Dioxide	1 hr 24 hrs Annual	0.25 ppm 0.04 ppm --	-- 365 mg/m^3 80 mg/m^3
PM_{10}	24 hrs Annual	50 mg/m^3 30 mg/m^3	150 mg/m^3 50 mg/m^3
Lead	30-day Calendar Qtr.	1.5 mg/m^3 --	-- 1.5 mg/m^3

Notes:
(1) "--" indicates no applicable standard

vertical and lateral confinement, air pollutants in SVAB become concentrated during summer months. During winter, the Pacific high-pressure system moves south and stormy, rainy weather intermittently dominates the Valley. Prevailing winter winds from the southeast disperse pollutants and provide clear, sunny weather at higher levels in the atmosphere.

Lake County. Summers in the Lake County air basin are warm in the daytime and cool at night, and the climate dry with very little rainfall in the late spring and summer months. Winter days are mild, with cold nights. The greatest amount of rainfall occurs between the months of November and March. The predominant wind direction is west-northwesterly throughout the year and keeps pollutants well dispersed in that region.

Mountain Counties. The mountain counties climate is characterized by warm days and cool nights in the summer, and cool days and cold nights in winter. Most of the precipitation falls between the months of November and April, with snow at the higher elevations in the winter and sometimes early spring. Winds are predominantly southerly in the fall and winter and southwesterly in the spring and summer.

San Francisco Bay Area Air Basin. The climate of SFBAAB generally consists of mild, rainy weather during winter and warm, dry weather from June through September. Most of the rainfall occurs during late fall and early spring (November to April) with little or no precipitation occurring from late spring to early fall. The frequent rains between November and April are associated with Pacific storms.

Prevailing winds in SFBAAB are from the northwest, flowing inland from the ocean. During winter, a southerly flow pattern predominates, with southeasterly winds occurring during daytime hours and calm winds in the late evening and early morning hours. During spring and summer seasons, the predominant flow pattern is moderate-to-strong northwesterly wind. Weak northwesterly winds predominate in fall. In summer, the Pacific high-pressure system typically remains near the coast, diverting storms to the north. Subsidence of warm air associated with the Pacific high-pressure system creates frequent summer atmospheric temperature inversions. Inversions may be several hundred to several thousand feet deep, effectively trapping pollutants in a small volume of air near the ground.

San Joaquin Valley Air Basin. The climate of San Joaquin Valley Air Basin (SJVAB) generally consists of hot summers and cool, rainy winters. Summer inversions are similar to those of SVAB. Approximately 90% of the rainfall occurs between November and April, with little or no precipitation occurring from late spring to early fall. Prevailing winds are usually oriented along the major axis of the San Joaquin Valley, following an approximately northwest-southeast pattern. A calm air flow pattern is predominant during winter. During spring, summer, and fall seasons, the predominant flow pattern is northwesterly, with slightly stronger windspeeds.

In summer, the Pacific high-pressure system moves north and no major storms or precipitation occur, creating daily inversion layers characterized by a layer of cool air over warm air. Surrounding mountains are at an elevation higher than that of summer inversion layers. As a result, SJVAB is highly susceptible to pollutant accumulation over time. In winter, the influence of the Pacific high-pressure system moves south and gives rise to alternate periods of unsettled stormy weather and stable, rainless conditions with winds from the southwest. Most of the San Joaquin Valley is in the rainshadow of the Coast Range and depends on cold, unstable northwesterly flow for its precipitation, which produces showers following frontal passages.

South Central Coast. The climate of South Central Coast generally consists of mild, rainy weather during winter and warm, dry weather from June through September. Most of the rainfall occurs during late fall and early spring (November to April) with little or no precipitation occurring from late spring to early fall. The frequent rains between November and April are associated with Pacific storms.

Prevailing winds are from the northwest, flowing inland from the ocean, except during winter, when a southeasterly flow pattern predominates. In summer, the Pacific high-pressure system typically remains near the coast.

South Coast and San Diego. The climate of South Coast generally consists of mild weather during winter and warm to hot, dry weather from June through September. Most of the rainfall occurs during late fall and early spring (November to April) with little or no precipitation occurring from late spring to early fall. The rains between November and April are associated with Pacific storms.

Prevailing winds are from the west, flowing inland from the ocean, except during winter, when winds change to a more easterly direction with the passage of winter storms. In summer, the Pacific high-pressure system typically remains near the coast. Subsidence of warm air associated with the Pacific high-pressure system creates frequent summer atmospheric temperature inversions

Mojave Desert and Salton Sea. The climate of this area is that of a desert, with mild days and cold nights in the winter and hot dry days and mild nights in the summer. Most of the sparse annual rainfall occurs during the months November to April. Winds are out of the northwest in the winter, spring, and fall, with a more southerly flow in the summer.

Existing Air Quality

The attainment status of each air basin in the study area is discussed below. Table 2 shows the attainment status for pollutants of concern in the study area. State standards are equal to or more stringent to federal standards for criteria pollutants. As such, an area that is a federal nonattainment area for a particular pollutant also does not attain the State standards for that pollutant.

Air quality trends of nonattainment pollutants and the emission sources of those pollutants are also discussed. The ARB develops trends of nonattainment pollutants in each air basin, in compliance with the California Clean Air Act (CCAA). The trends are developed statistically from monitoring data, but Afilter@ out the effects of yearly meteorological variations, which

TABLE 2
STATE AND FEDERAL ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN AIR BASINS OF CONCERN WITHIN THE CALFED STUDY AREA

	Federal Standards				State Standards			
	O_3	CO	NO_x	PM_{10}	O_3	CO	NO_x	PM_{10}
AIR BASIN								
North Coast	U/A	U/A	U/A	U	A	U	A	NA
Northeast Plateau	U/A	U/A	U/A	U	A	U	A	NA
Sacramento Valley	NA	A	U/A	U	NA	A	A	NA
Sacramento Valley-Urbanized Area	NA	A	U/A	NA	NA	A	A	NA
Lake County	U/A	U/A	U/A	U	A	A	A	A
Mountain Counties	U/A[a]	U/A[a]	U/A	U	NA	U	A	NA
San Francisco Bay Area	U/A	A	U/A	U	NA	A	A	NA
San Francisco Bay Area Urbanized Area	U/A	A	U/A	U	NA	A	A	NA
San Joaquin Valley	NA	U/A	U/A	NA	NA	A	A	NA
S.J. Valley - Urbanized Area	NA	NA	U/A	NA	NA	NA	A	NA
South Central Coast	NA	U/A	U/A	U	NA	A	A	NA
South Coast	NA	NA	NA	NA	NA	NA	A	NA
San Diego	NA	NA	U/A	U	NA	A	A	NA
Mojave Desert	N	U/A	U/A	NA	NA	A	A	NA
Salton Sea	N	U/A	UA	NA	NA	U	A	NA

[a] = Except for portions of El Dorado and Placer Counties.
[b] = Except for Mono County and Mammoth Lakes, which are non attainment.
[c] = Transitional in MonoCounty,

Key:
A=Attainment
NA= Nonattainment
U/A= Unclassified/Attainment-used in areas that are not heavily urbanized where no air quality problems are expected, and thus not enough ambient monitoring is done to classify the area.
U= Unclassified-insufficient monitoring data gathered to classify with regard to attainment status. The federal PM_{10} standard was recently established (the former standard was for total particulates), and PM_{10} monitoring has not been conducted long enough to classify attainment status.

greatly influence pollutant concentrations. Thus, the ARB-developed trends show a true picture of progress, or lack thereof, toward reduction in pollutant levels in a given region. The air quality indicator of trends, discussed for each air basin below, is the Expected Peak Daily Concentration. This would be the annual maximum pollutant concentration with the meteorological influences statistically Afiltered@ out. In the air quality trends figures, pollutant trends are compared to baseline levels. These baseline levels were established in 1987 by the CCAA and are levels from which air pollutant levels must decrease in the future. These baseline levels differ for each air basin.

With regard to future levels of nonattainment pollutant concentrations, it is expected that these trends would continue, given California=s regulatory constraints on emission-producing sources and continued improvements in vehicular emission controls. Air quality trends for nonattainment pollutants are shown in Figures 2-7.

Following the discussion of nonattainment pollutant trends in the air basins is a discussion of major emissions sources in the basin.

North Coast. The North Coast air basin attains state and federal standards, or is unclassified, for O_3, CO, and NO_x . For PM_{10}, the area attains, or is unclassified for, federal standards, but is nonattainment for state standard, which is more stringent than the federal standard.

Major secondary CO sources in this air basin include waste burning, residential fuel combustion, operation of utility equipment, industrial processes, and fuel combustion. Major sources of O_3 precursors, other than mobile sources, include solvent evaporation, cleaning and surface coatings, industrial processes, and petroleum production and marketing. The major secondary source of PM_{10} is road dust.

Northeast Plateau. The Northeast Plateau air basin attains state and federal standards, or is unclassified, for O_3, CO, and NO_x . For PM_{10}, the area attains, or is unclassified for, federal standards, but is nonattainment for state standard, which is more stringent than the federal standard. As this is not a heavily populated or urbanized area, or an area that attracts much growth, future air quality pollutant levels are expected to remain low.

The major sources of CO, O_3 precursors, and PM_{10}, other than mobile sources, are from waste burning and disposal and residential fuel combustion. Solvent evaporation also contributes to ROG emissions in the air basin.

Sacramento Valley Air Basin. Sacramento County is a federally designated nonattainment area for PM_{10}. Consequently, a PM_{10} SIP is also required for Sacramento County. Monitoring data have verified a period of 4 years without a violation of the federal PM_{10} standards, allowing SMAQMD to request a redesignation from nonattainment to attainment of the federal standards. The remainder of the Sacramento Valley Air Basin attains the federal PM_{10} standard.

Monitoring data for the Sacramento nonattainment area for CO, show that the area is actually in attainment for the State and federal CO standards. ARB is preparing SIPs and CO maintenance plans for areas of California currently designated as federal nonattainment areas and has submitted a request for the Sacramento urbanized area to be redesigned as a federal and State CO attainment area.

The Sacramento urbanized area does not attain the federal O_3 standards, but the upper portion of the SVAB is an attainment area, or is unclassified, for O_3. With respect to state standards, the upper portion of the SVAB is a nonattainment area for O_3. The entire Sacramento Valley air basin is a federal and state attainment area for NO_x.

A graph of ozone trends over a 12-year period for a monitoring station in Sacramento is shown in Figure 2. From 1982 to 1987, most of the trends in the peak O_3 concentrations showed degradation. In this period, Expected Peak Day Concentration (EPDC) values, which represent the highest annual concentration, increased at six sites and decreased at three sites. From 1987 to 1992, peak ozone levels improved throughout the region.

Figure 3 shows a graph of CO trends at a monitoring station in Sacramento. From 1982 to 1987, EPDC values generally increased; on average, the EPDC value increased by 0.9 ppm. However, improvements in EPDC values from 1987 to 1992 were greater than any increases during the first half of the trend period, with especially strong improvements from 1990 through 1992.

Trends in PM_{10} (another area nonattainment pollutant) are not ascertained by the ARB because the CCAA does not require attainment plans for PM_{10}, even though the federal Clean Air Act does. Furthermore, a new particulate matter standard, $PM_{2.5}$, is expected to be adopted by the EPA and would be the standard against which monitoring data are compared. As no $PM_{2.5}$ monitoring data yet exist, trends in $PM_{2.5}$ cannot be developed.

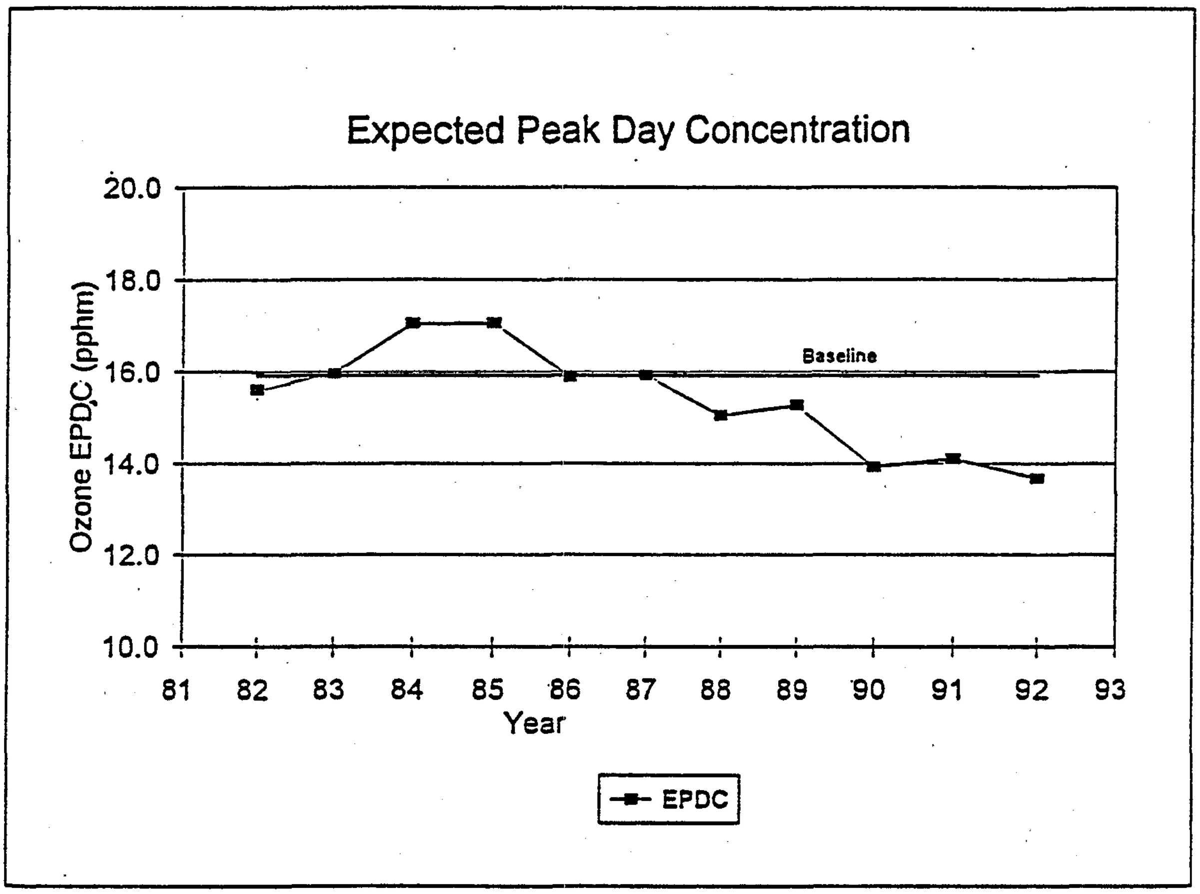
Motor vehicles are the primary source of CO emissions in most areas, including the study area. Motor vehicles are also the primary source of O_3 precursors ROG and NO_x, while PM_{10} emissions in the study area are generated primarily in the form of roadway dust.

Major secondary CO sources in the SVAB include waste burning and disposal, residential fuel combustion, operation of utility equipment, and industrial fuel combustion, in that order. Major sources of ROG and NO_x, other than mobile sources, include solvent evaporation, cleaning and surface coatings, waste burning and disposal, industrial fuel combustion, and petroleum production and marketing, in that order.

Major secondary sources of PM_{10} are agricultural operations, construction and demolition, waste burning and disposal, and fugitive windblown dust, in that order.

Lake County. The Lake County air basin attains, or is unclassified for, both federal and state standards for all pollutants. Other than mobile sources and road dust, there are no significant sources of air pollutants in this basin.

Mountain Counties. For all pollutants, this air basin is in attainment of, or unclassified



Project No. S9634	CALFED PEIR	OZONE TREND – SACRAMENTO DEL PASO MANOR STATION	Figure 2
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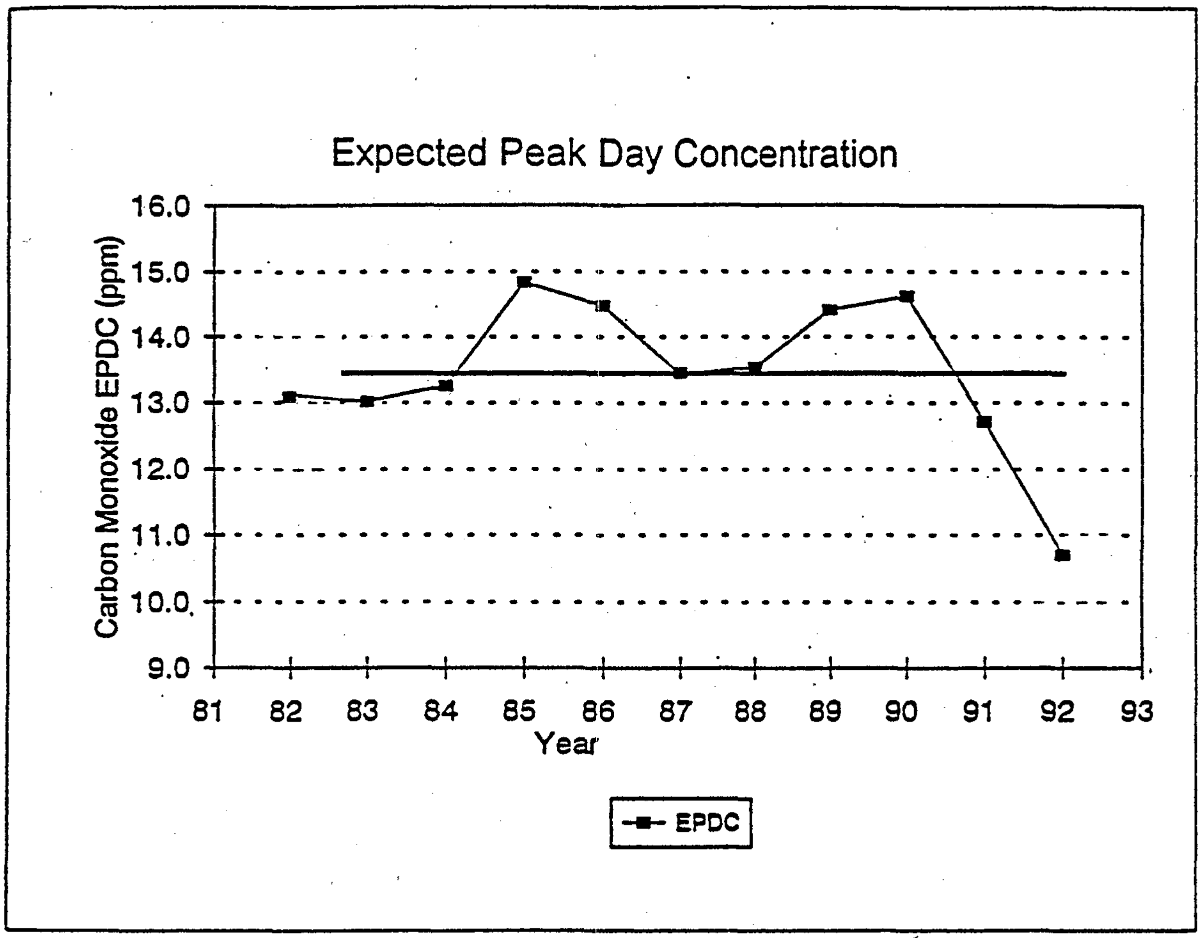

Project No. S9634	CALFED PEIR	CARBON MONOXIDE TREND – EL CAMINO AND WATT STATION IN SACRAMENTO	Figure 3
Woodward-Clyde Consultants			

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for, State and federal standards. Although monitors in the Mountain Counties Air Basin have recorded exceedances of the State O_3 standard, this region has no planning requirements at this time because pollutants transported from other basins appear to be the cause of these exceedances (ARB 1995). Because of the limited data available, no exposure trends were calculated for this basin.

The major sources of CO, O_3 precursors, and PM_{10}, other than mobile sources, are from residential fuel combustion, waste burning and disposal, and industrial and commercial fuel combustion, in that order.

San Francisco Bay Area Air Basin. BAAQMD has a completed CO SIP; however, monitoring data for the San Francisco Bay Area Air Basin (SFBAAB) nonattainment area for CO show that the area is in attainment of the federal CO standards. ARB has submitted a request for the SFBAAB nonattainment area for CO to be redesigned as a federal CO attainment area. EPA has until late 1997 to review and act upon this request for redesignation. This area is in attainment of federal standards for O_3, NO_x, and PM_{10}, but does not attain State standards for O_3 or PM_{10}.

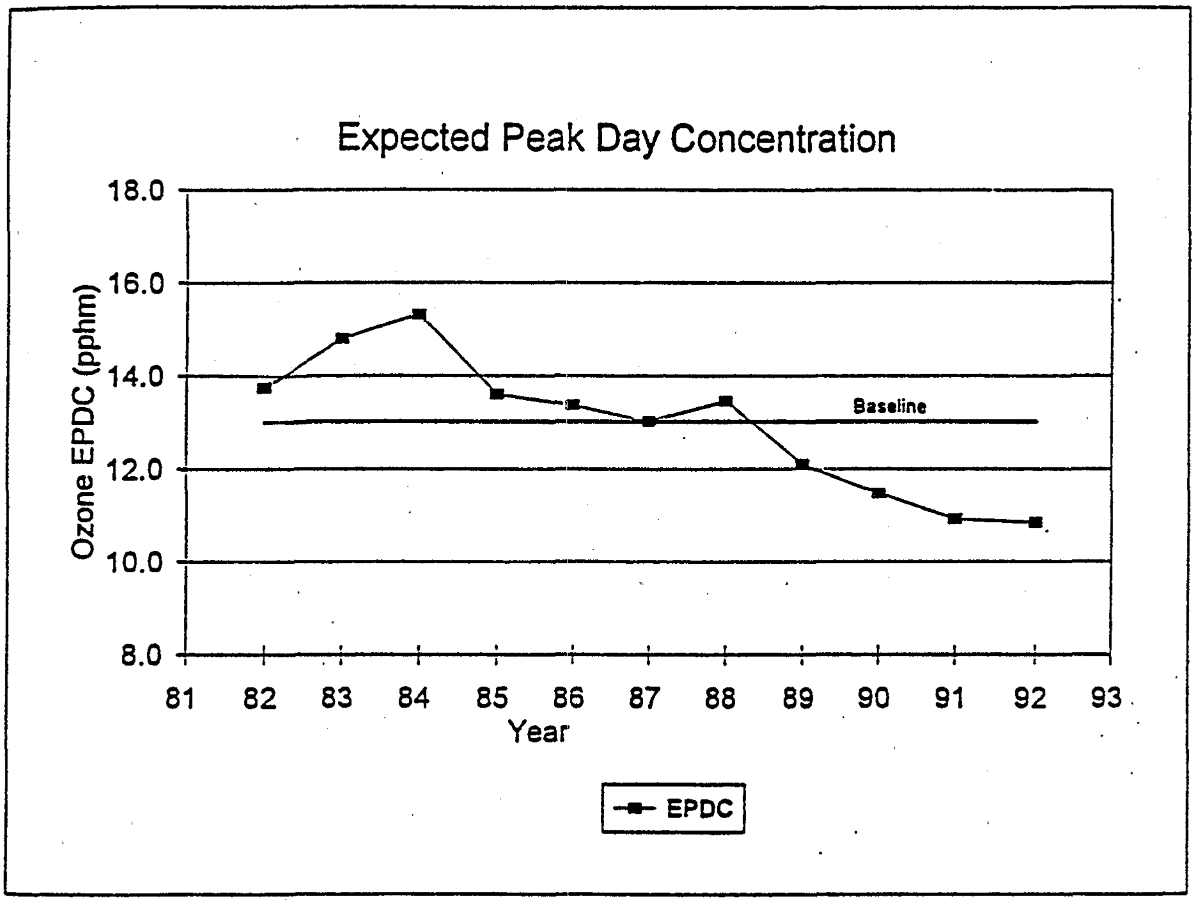
A graph of O_3 trends at a monitoring station in the SFBAAB is shown in Figure 4. From 1982 to 1987, trends in the peak O_3 concentrations were mixed, but from 1987 to 1992, peak O_3 levels improved throughout the region. During this period, the EPDC values declined at 18 of the 19 sites, with an average decrease of 1.7 parts per hundred million (pphm) for the 19 sites.

A graph of CO trends at a station in the SFBAAB is shown in Figure 5. The EPDC trend at a monitoring station in San Jose was not consistent during the trend period (1981 - 1993), and only recently did the EPDC values dip below the 1987 baseline level for this area. A monitoring site in Vallejo showed four percent measured progress from 1982 to 1987, and 19 percent measured progress from 1987 to 1992. Trends in PM_{10} are not discussed for the reasons mentioned above

Major secondary CO sources in the SFBAAB include residential fuel combustion, operation of utility equipment, miscellaneous industrial processes, and industrial fuel combustion, in that order. Major sources of ROG and NO_x, other than mobile sources, include industrial fuel combustion, solvent evaporation, cleaning and surface coatings, petroleum production and marketing, and residential fuel combustion, in that order. Major secondary sources of PM_{10} are construction and demolition, residential fuel combustion, and mobile sources, in that order.

San Joaquin Valley Air Basin. The San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD) air quality attainment plan, which focused on attainment of O_3 standards, was approved by ARB in January 1992. The SJVAB is also nonattainment for federal CO and PM_{10} standards; thus, SJVUAPCD has also completed SIPs for CO, O_3, and PM_{10} for which EPA approval is pending. The SJVAB attains both the State and federal NO_x standards.

Ozone trends for a station in the SJVAB are



Project No. S9634	CALFED PEIR	OZONE TREND – SAN JOSE 4TH STREET STATION	Figure 4
Woodward-Clyde Consultants			

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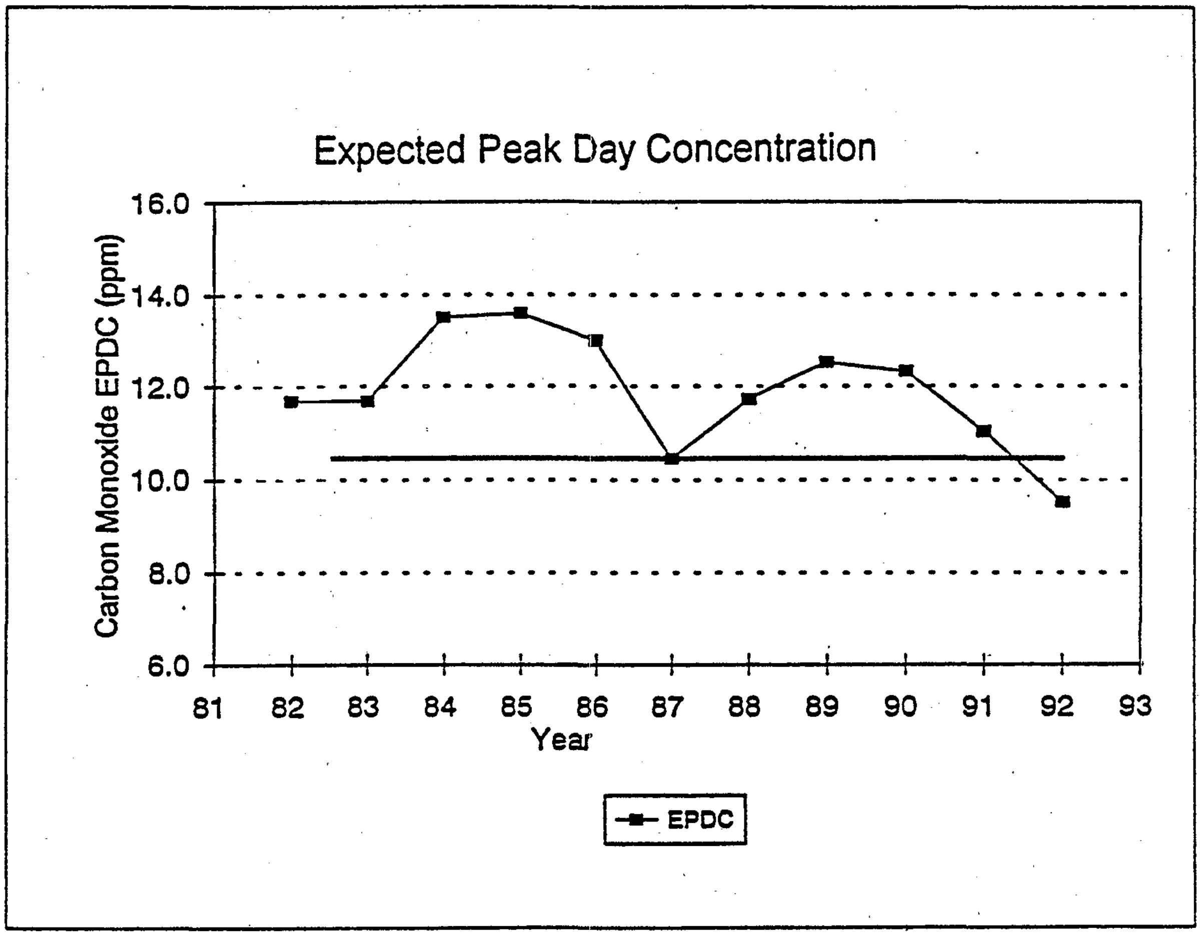

Project No. S9634	CALFED PEIR	CARBON MONOXIDE TREND – SAN JOSE 4TH STREET STATION	Figure 5
Woodward-Clyde Consultants			

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shown in Figure 6. The EPDC trends were not consistent during the period from 1982 to 1987; some EPDC values increased and some decreased. From 1987 to 1992, on the other hand, the EPDC values improved throughout the region, when the values decreased at all of the sites, with an average decrease of 1.2 pphm.

CO trends at a monitoring station in Stockton are shown in Figure 7. This graph shows an increase in the EPDC from 1984 to 1987 and then again from 1988 to 1989. The EPDCs then decrease consistently from 1990 onward. The trends in EPDCs varied from station to station in this air basin, but in general, there was a decrease at all monitoring stations after 1990.

Major secondary CO sources in the SJVAB include waste burning and disposal, residential fuel combustion, operation of utility equipment, and industrial fuel combustion, in that order. Major sources of ROG and NO_x, other than mobile sources, include industrial fuel combustion, solvent evaporation, petroleum production and marketing, cleaning and surface coatings, and waste burning and disposal, in that order. Major secondary sources of PM_{10} are fugitive windblown dust, agricultural operations, construction and demolition, mobile sources, and waste burning and disposal, in that order.

South Central Coast. The South Central Coast air basin attains state and federal standards, or is unclassified, for CO and NO_x, but does not attain either the federal or state standard for O_3. For PM_{10}, the area attains, or is unclassified for, federal standards, but is nonattainment for state standard, which is more stringent than the federal standard.

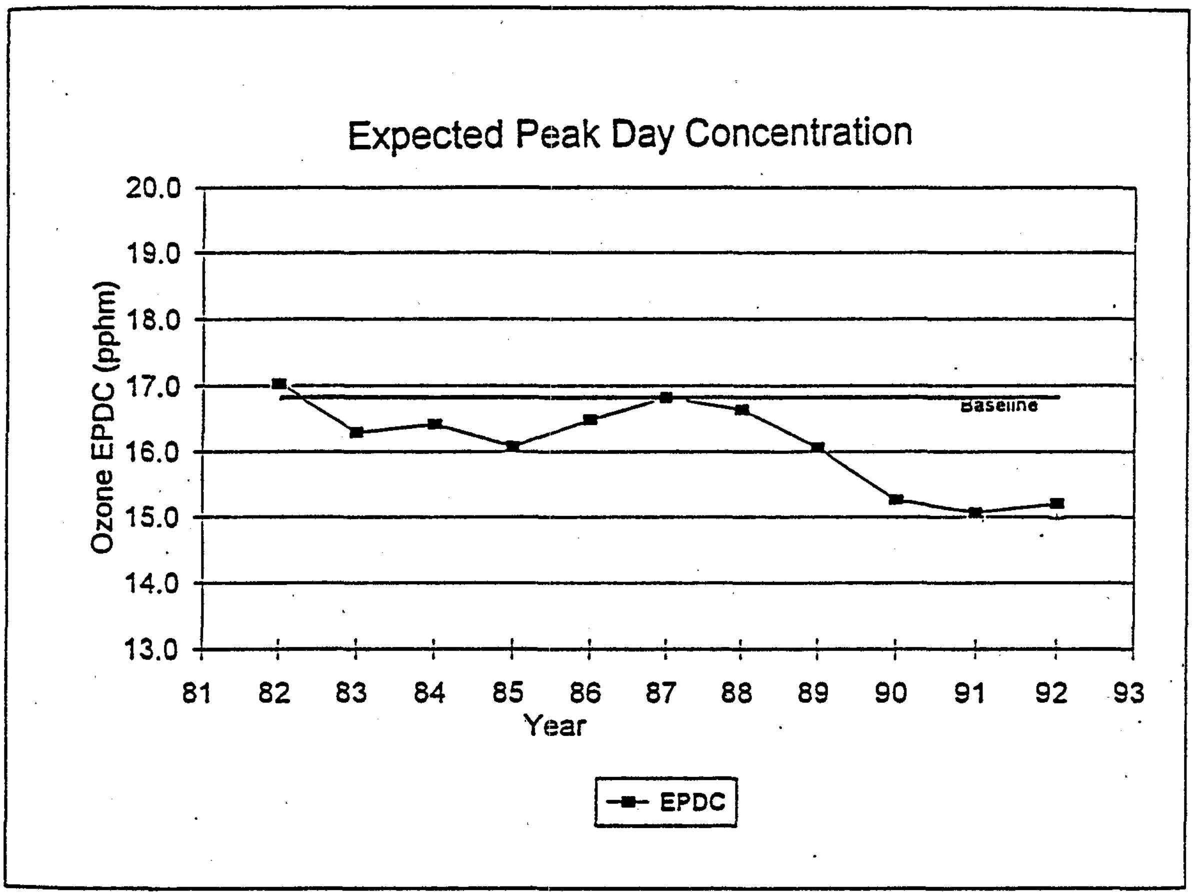
Ozone trends for a station in Nipomo are shown in Figure 8. From 1982 to 1987, the EPDC trends in this air basin were mixed, with some sites decreasing and some increasing. From 1987 to 1992 however, the EPCDs at all sites improved.

Major secondary CO sources in this air basin include residential fuel combustion and operation of utility equipment. Major sources of ROG and NO_x, other than mobile sources, include fuel combustion, solvent evaporation, petroleum production, and cleaning and surface coatings. Major secondary sources of PM_{10} are construction and demolition, road dust, and fugitive windblown dust.

South Coast. The South Coast Air Quality Management District's (SCAQMD) air quality attainment plan, which focused on attainment of O_3 standards, has been approved by the EPA. The SCAQMD is also nonattainment for federal CO and PM_{10} standards; thus, SCAQMD has also completed SIPs for CO and PM_{10} for which EPA approval is pending. The SCAQMD attains both the State and federal NO_x standards.

Ozone trends for a station in Glendora are shown in Figure 9. The EPDC values declined from 1982 to 1987, and declined further from 1987 to 1992. Peak ozone measurements declined substantially in every part of the South Coast Air Basin.

CO trends at a monitoring station in Reseda are shown in Figure 10. The EPDC values declined from 1982 to 1987 with an improvement of about 3 ppm. From 1987 to 1992, the average decrease was 1.4 ppm.



Project No. S9634	CALFED PEIR	OZONE TREND – EDISON STATION	Figure 6
Woodward-Clyde Consultants			

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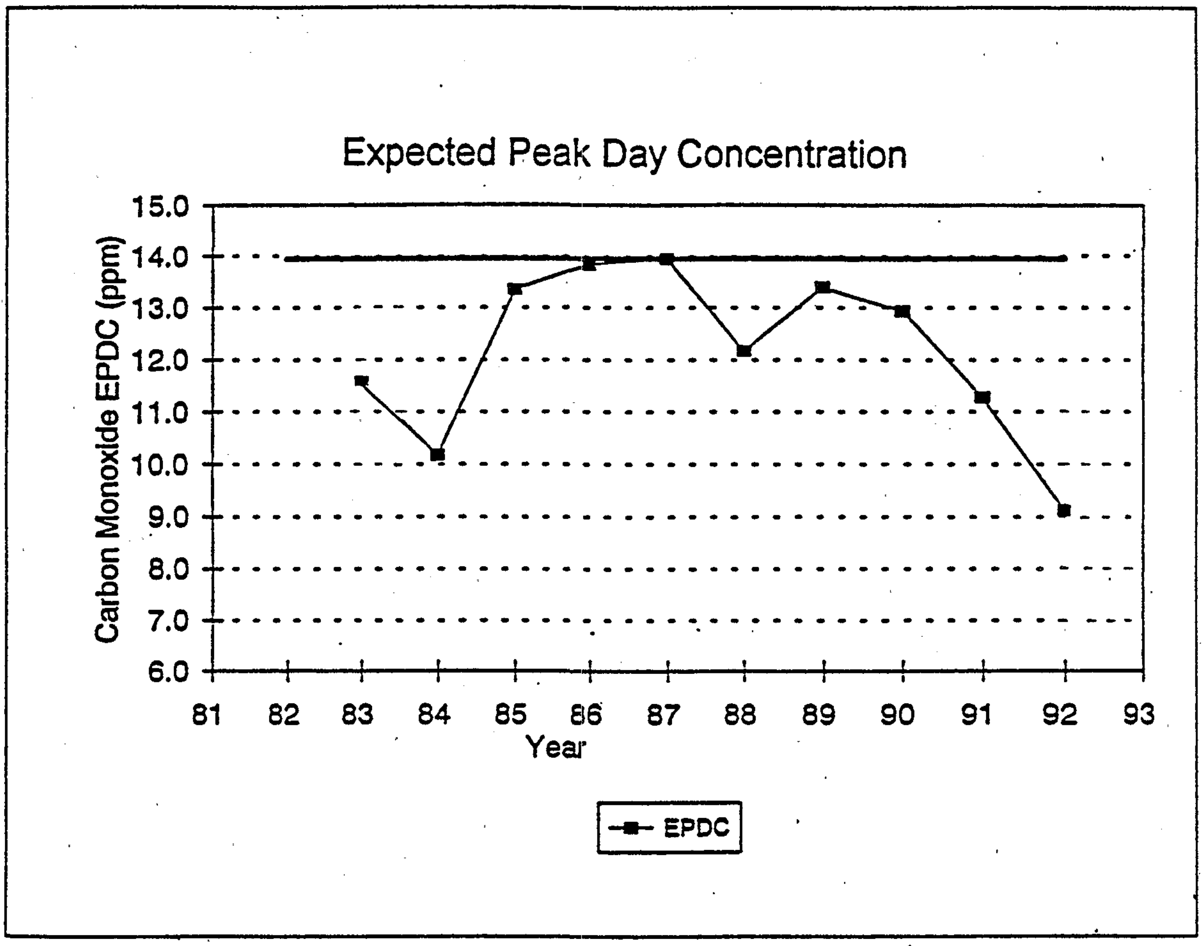

Project No. S9634	CALFED PEIR	CARBON MONOXIDE TREND – STOCKTON CLAREMONT STATION	Figure 7
Woodward-Clyde Consultants			

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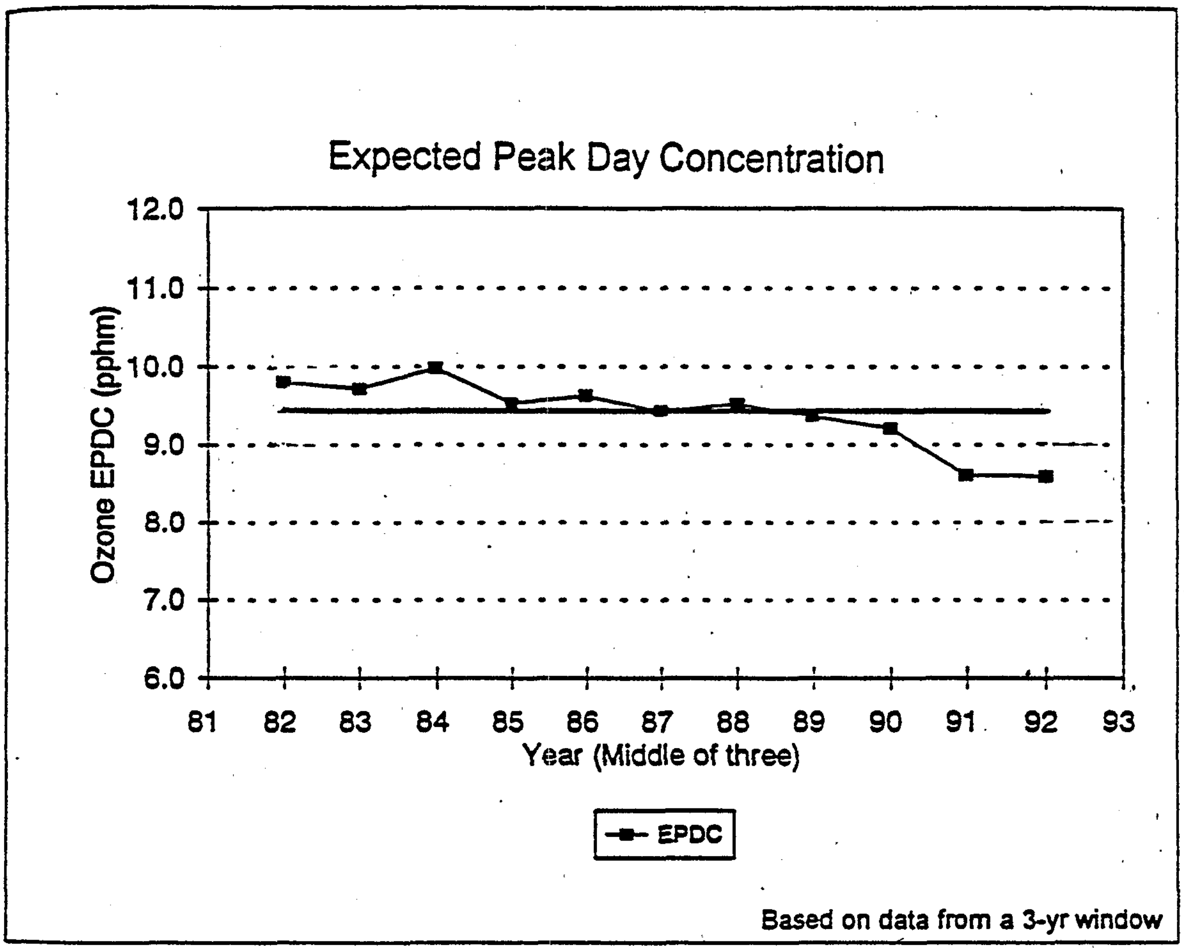

Project No. S9634	CALFED PEIR	OZONE TREND – NIPOMO STATION	Figure 8
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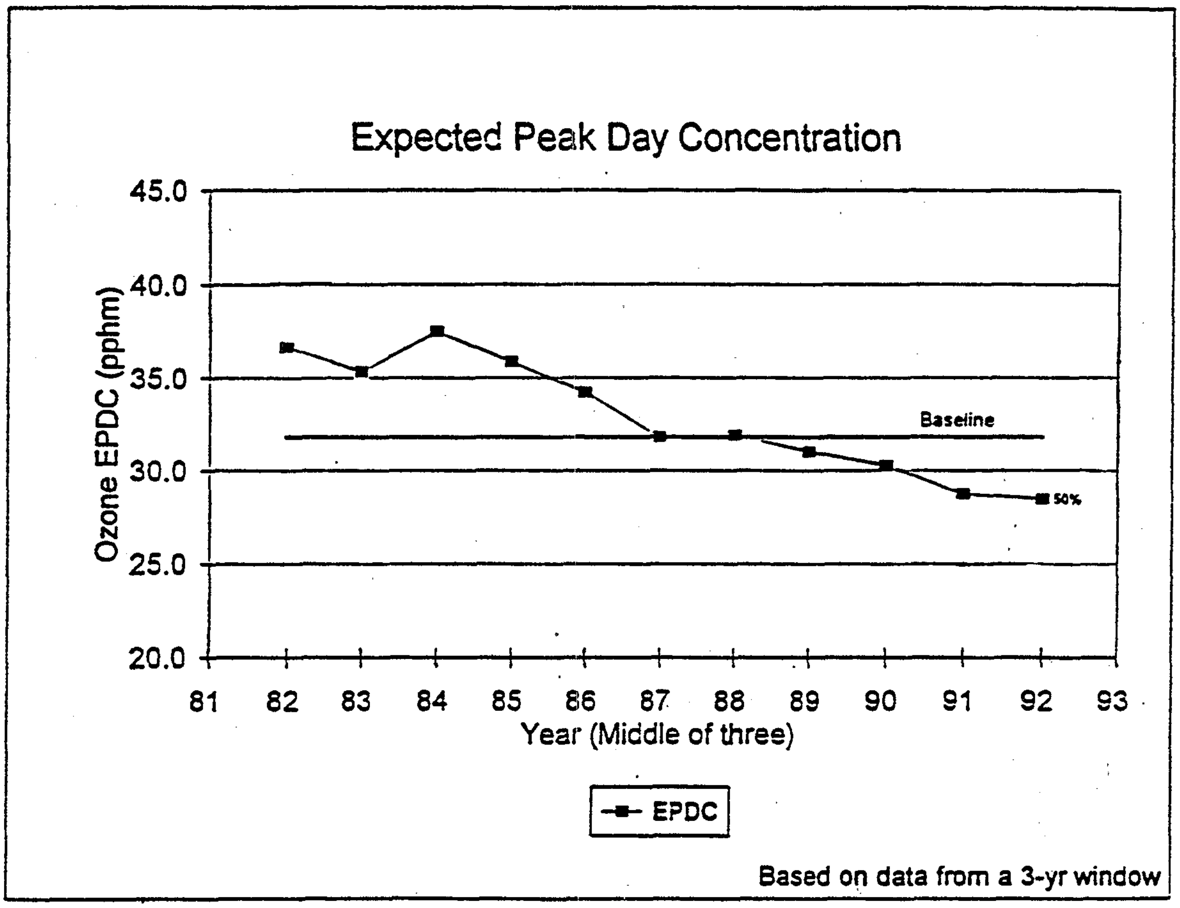

Project No. S9634	CALFED PEIR	OZONE TREND – GLENDORA STATION	Figure 9
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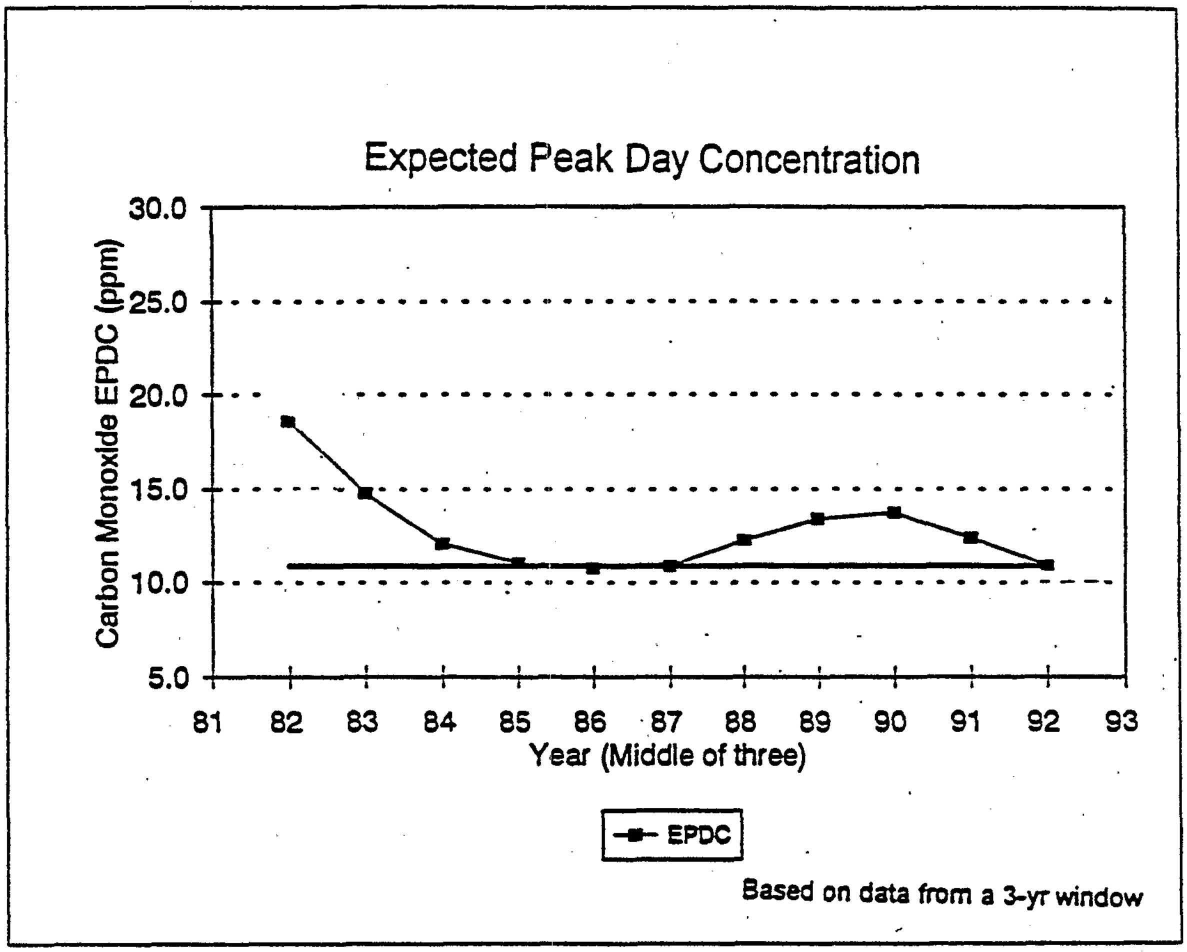

Project No. S9634	CALFED PEIR	CARBON MONOXIDE TREND – RESEDA STATION	Figure 10
Woodward-Clyde Consultants			

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Major secondary CO sources in the South Coast include residential fuel combustion, and operation of utility equipment. Major sources of ROG and NO_x, other than mobile sources, include solvent evaporation, cleaning and surface coatings, and petroleum production and marketing. Major secondary sources of PM_{10} are construction and demolition and fugitive windblown dust.

San Diego. The San Diego air basin attains state and federal standards for CO and NO_x, but does not attain either the federal or state standard for O_3, and therefore has had to submit a SIP to EPA for approval. For PM_{10}, the area does not attain federal state or standards.

Ozone trends for a station in the SJVAB are shown in Figure 11. Throughout the air basin, the EPDC values improved from 1982 to 1992, despite some increases from 1988 to 1990. From 1982 to 1987, ozone levels decreased, with an average improvement of 1.8 pphm. From 1987 to 1992, ozone levels continued to decrease, with an average improvement of 1.6 pphm.

Major secondary CO sources in the San Diego area include residential fuel combustion and operation of utility equipment. Major sources of ROG and NO_x, other than mobile sources, include solvent evaporation, cleaning and surface coatings, and residential fuel combustion. Major secondary sources of PM_{10} are construction and demolition and road dust.

Mojave Desert. The Mojave Desert air basin attains state and federal standards, or is unclassified, for CO and NO_x, but does not attain either federal or state standards for O_3 and PM_{10}.

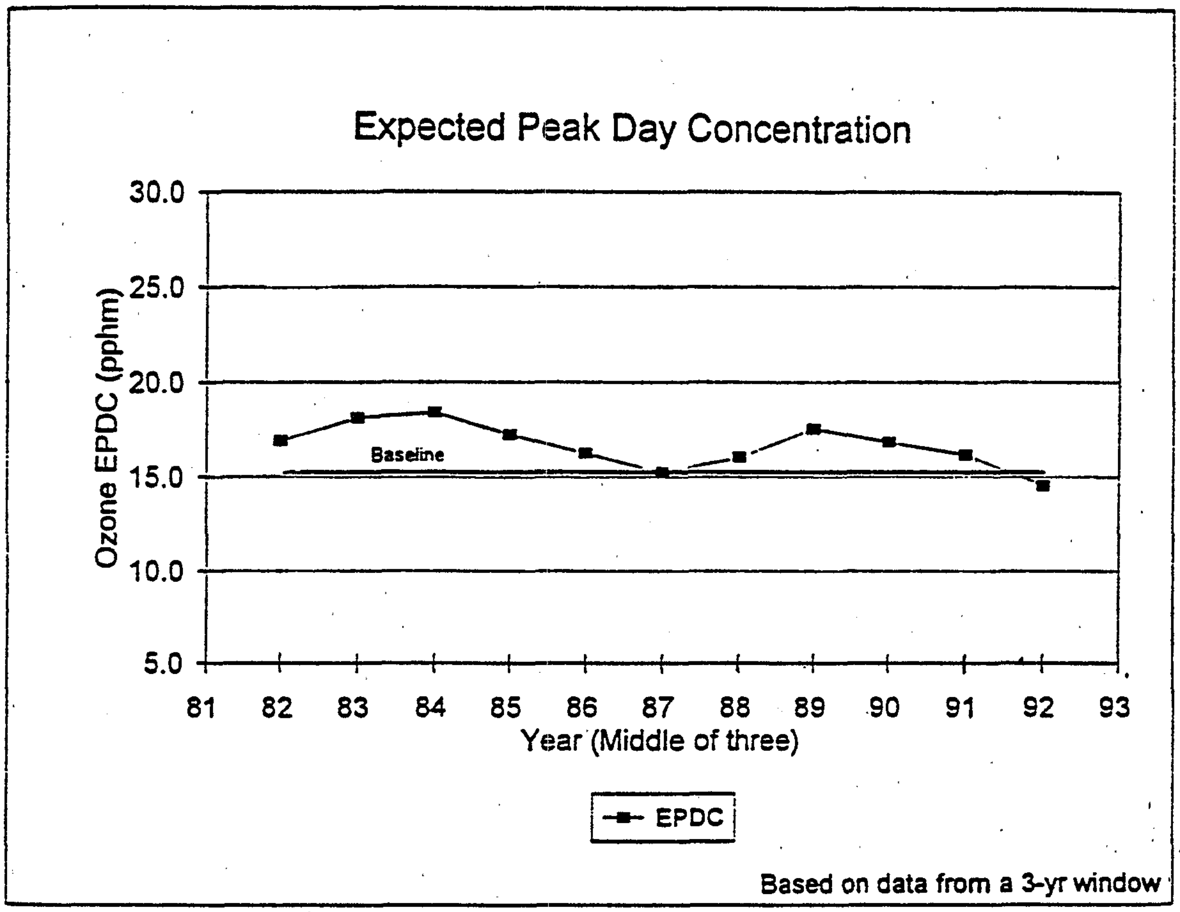
Ozone trends for a station in the SJVAB are shown in Figure 12. The EPDC values generally improved during the trend period, although short-term reversals occurred from 1986 to 1988. From 1987 to 1992, the EPDC values steadily improved, with an average reduction of 1.8 pphm.

Major secondary CO sources in the Mojave Desert include residential fuel combustion and operation of utility equipment. Major sources of ROG and NO_x, other than mobile sources, include solvent evaporation, and industrial processes. Major secondary sources of PM_{10} are fugitive windblown dust, construction and demolition, and road dust.

Salton Sea. This air basin attains state and federal standards, or is unclassified, for CO and NO_x, but does not attain either federal or state standards for O_3 and PM_{10}.

Ozone trends for a station in the SJVAB are shown in Figure 13. The EPDC values increased slightly from 1982 to 1983, then decreased for the remainder of the period of evaluation, until 1992. The reduction in ozone levels was about 3 pphm from 1982 to 1992.

Major CO, ROG, NO_x, and PM_{10} sources are the same as those in the Mojave Desert Air Basin.



Project No. S9634	CALFED PEIR	OZONE TREND – SAN DIEGO OVERLAND STATION	Figure 11
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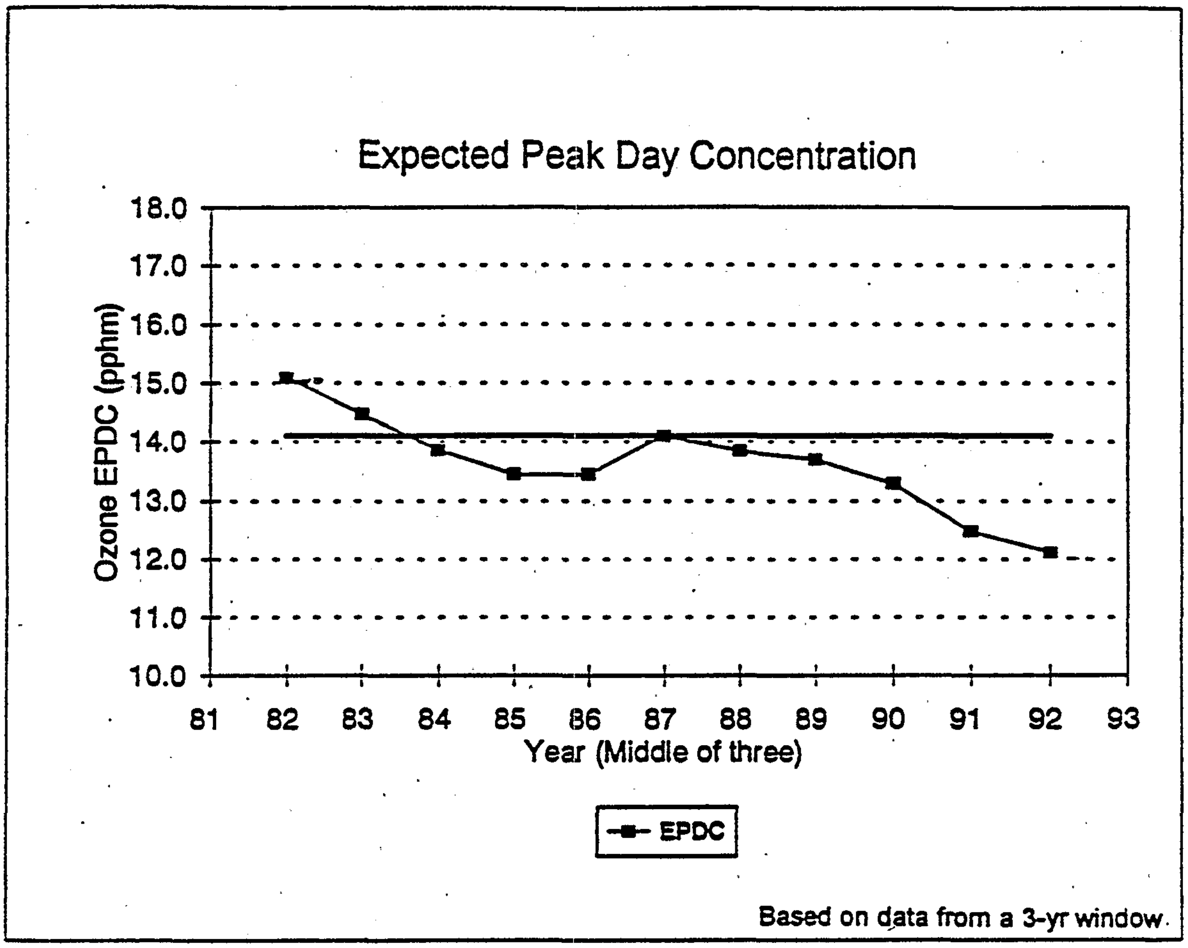

Project No. S9634	CALFED PEIR	OZONE TREND – BARSTOW STATION	Figure 12
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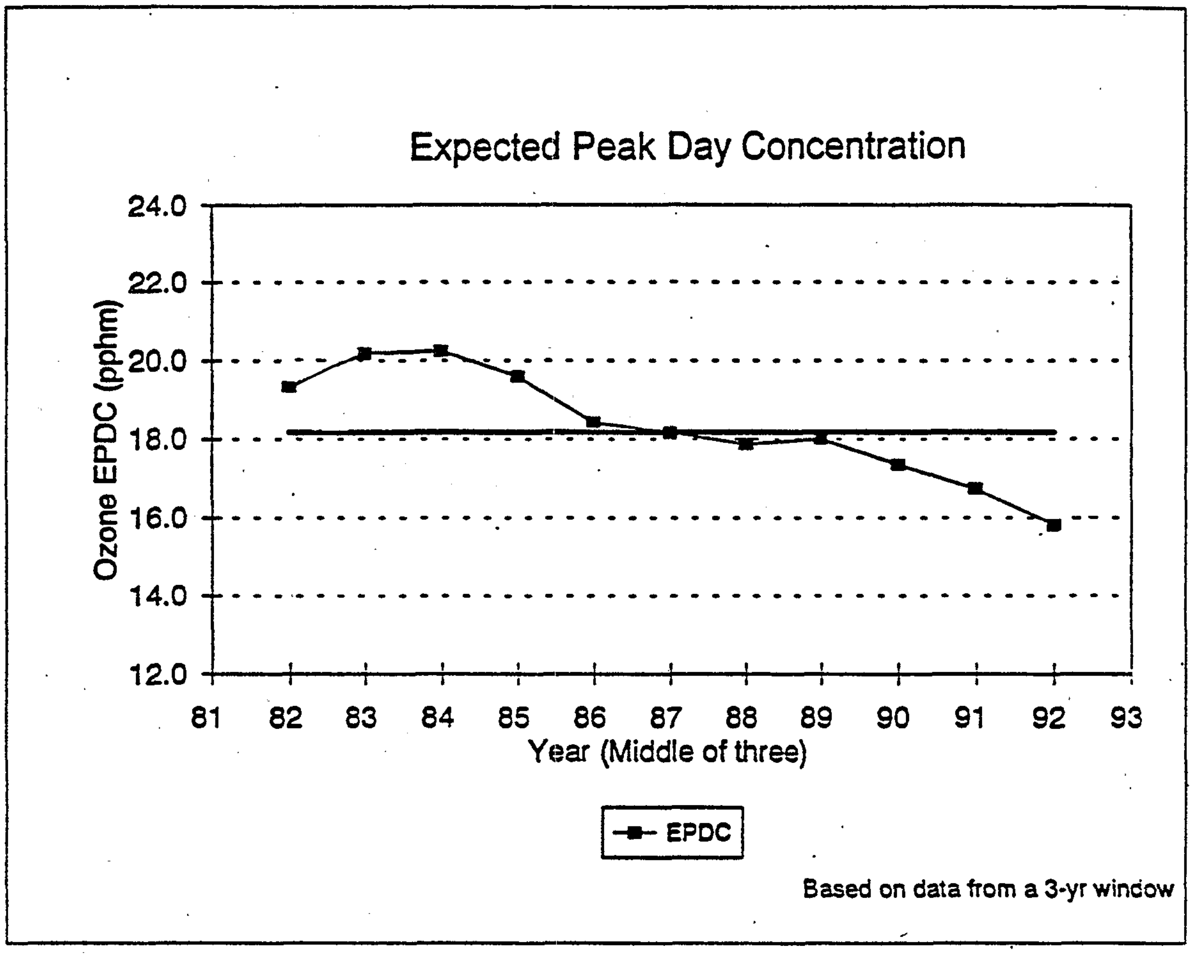

Project No. S9634	CALFED PEIR	OZONE TREND – PALM SPRINGS STATION	Figure 13
Woodward-Clyde Consultants			

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Air Quality Environmental Impacts/Consequences

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1.0 INTRODUCTION

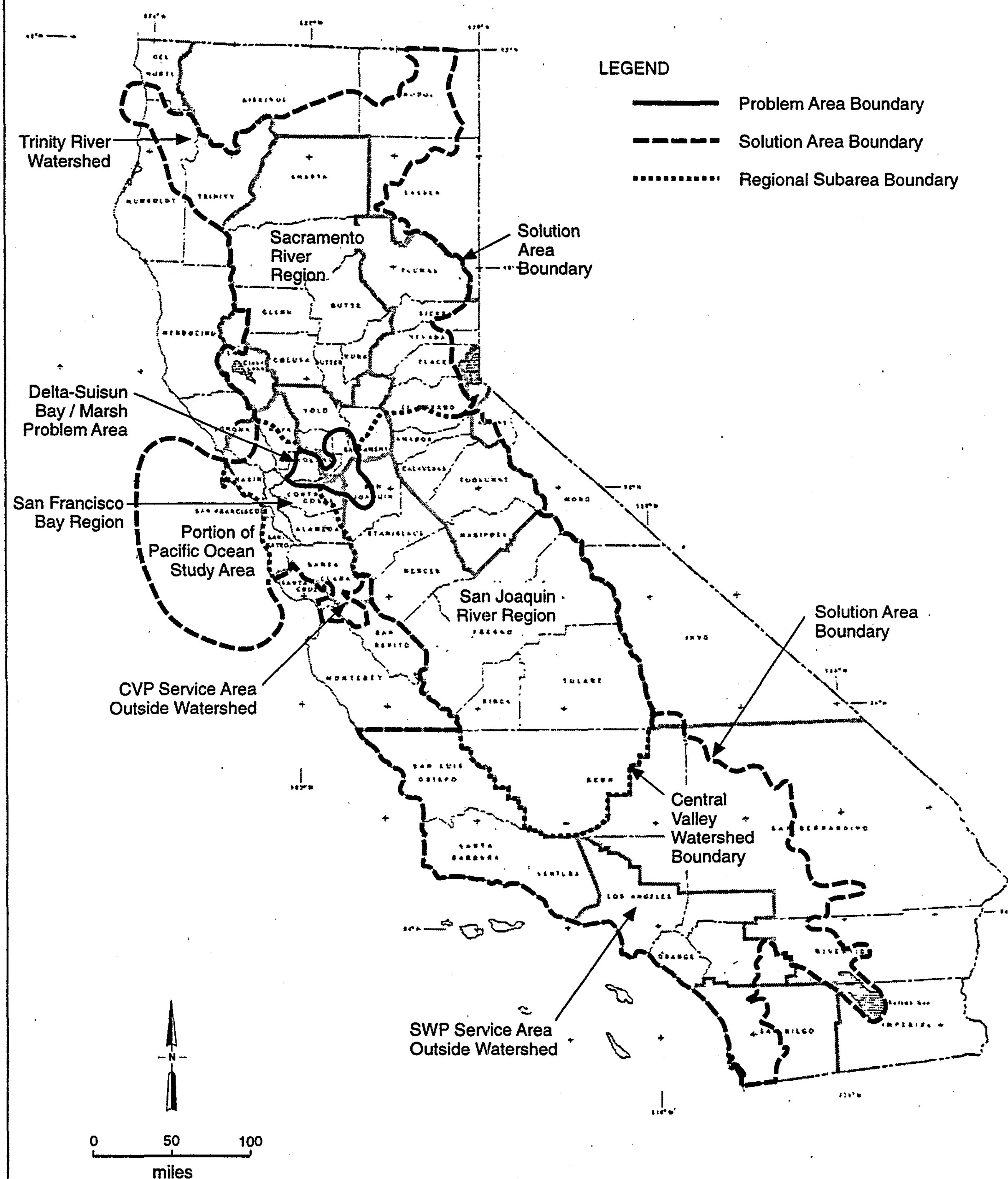
This technical appendix presents the air quality assessment that was used during the preparation of the impact analysis for the Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The results of this evaluation are summarized in this technical appendix and in the EIR/EIS.

Following the summary of impacts presented in this technical appendix, the assessment methods and significance criteria used to evaluate impacts are discussed. These sections identify assessment tools, methods for impact assessment and the significance criteria used to satisfy California Environmental Quality Act (CEQA) guidelines for establishment of thresholds for impact significance.

The CALFED Bay-Delta Program has developed three comprehensive solution alternatives that meet the program goals. Each alternative is composed of a set of four common programs (ecosystem quality, water quality, levee system vulnerability, and water supply reliability), a relative constant within each alternative, and a set of features unique to each alternative variations. All of the features were developed independently of the alternatives to meet specific goals. Physical differences between the alternatives lie mainly in the method of transporting water through or around the Delta (conveyance), and the amount of additional water storage included in each alternative. Each of the three alternatives includes a variety of potential combinations, or variations of conveyance and storage consistent with the fundamental differences between the three concept constructs (i.e., Variations 1A-1C, 2A-2E, and 3A-3I). While the basic composition of the common programs remains relatively constant in each alternative, they may perform somewhat differently depending on the storage and conveyance components included within a specific alternative formulation. This programmatic approach results in descriptions of alternatives that include various levels of detail. In most cases the physical components are described in some detail while the locations are described in more general terms. Because the specific location for most of the alternative features is not known, a site-specific impact analysis cannot be made.

The impact assessment begins with a description of the No Action Alternative. Then, impacts from each of the three alternatives is discussed. Each of these discussions is done separately for each of the geographic regions, e.g., Delta, that comprise the CALFED solution area. Under the analysis for each alternative, all four common programs are addressed as well as the storage and conveyance components that vary by alternative.

The impact analysis was conducted for five geographic regions including: the Delta Region, Bay Region (North San Pablo Bay and Suisun Marsh), Sacramento River Region, San Joaquin River Region, and the Central Valley Project (CVP) and the State Water Project (SWP) Service Areas outside the Central Valley. The level of detail provided is greatest for the Delta region and less for other regions. The least amount of detail is provided for storage facilities in each of the identified regions. Figure 1-1 shows the boundaries for each of the regions comprising the study area developed by CALFED.



Project No. S9634	CALFED BAY-DELTA PROGRAM Environmental Impact/ Consequences Technical Report	CALFED STUDY AREA AND REGIONS	Figure 1-1
Woodward-Clyde			

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For purposes of the air quality assessment the five geographic regions are addressed in terms of the specific air basins within each region. The basins that coincide with each of the geographic regions are summarized below. This analysis only includes areas where there are construction activities or where other changes in pollution emissions to the atmosphere occur. In some cases a region includes only a portion of a specified air basin. Figure 1-2 illustrates the locations of each air basin with regard to each of the project related regions within the CALFED study area.

Delta Region

* Sacramento Valley Air Basin
* San Joaquin Valley Air Basin
* San Francisco Bay Area Air Basin

Bay Region

* San Francisco Bay Area Air Basin

Sacramento River Region

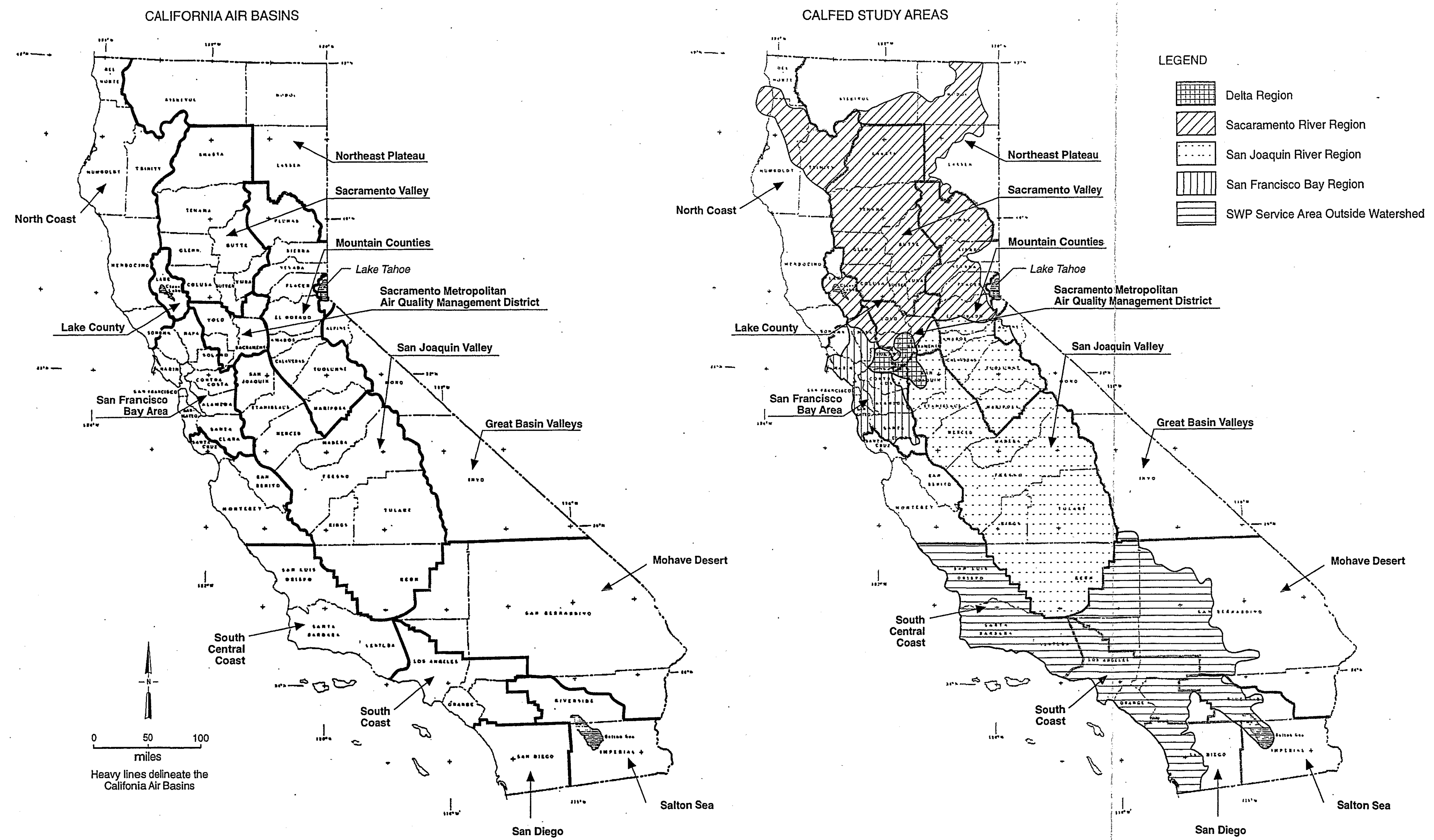
* Sacramento Valley Air Basin
* Northeast Plateau Air Basin
* Lake Counties Air Basin
* Mountain Counties Air Basin
* North Coast Air Basin
* San Francisco Bay Area Air Basin

San Joaquin River Region

* San Joaquin Valley Air Basin
* Mountain Counties Air Basin
* San Francisco Bay Area Air Basin

CVP and SWP Service Areas outside the Central Valley

The location of the CVP and SWP service area is located outside the Central Valley and therefore, lies outside the air basins which could be affected by proposed project actions. It has been concluded that air quality impacts directly related to proposed project actions would be unlikely within this designated CALFED region. No further details regarding the air quality impacts for this region will be included in this technical appendix.



Project No. S9634	CALFED BAY-DELTA PROGRAM Air Quality Environmental Impact/ Consequences Technical Report	CALIFORNIA AIR BASINS AND CALFED STUDY AREA	Figure 1-2
Woodward-Clyde Consultants			

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2.0 EXECUTIVE SUMMARY

2.1 Summary Of Potential Significant Impacts

Significant air quality impacts due to each of the three alternatives will be the same by nature, but different by degree. Therefore, this summary focuses on the type and significance of air quality impacts.

The majority of the four common programs combined with the alternative actions will create emissions causing temporary, potentially significant impacts. Little or no detrimental long term impacts should occur due to this proposed project. The majority of the impacts would be confined to the Sacramento and San Joaquin Valley Air Basins with some potential impacts to the San Francisco Bay Area Air Basin. Criteria pollutants of concern would include respirable particulate matter less than 10 micrometers in diameter (PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_x) sulfur dioxide (SO_2), and reactive organic compounds (ROG). Toxic air contaminants could also be of some concern.

Much of the air quality concerns for these actions are unavoidable, short term construction impacts from fugitive dust (PM_{10}) and other pollutants from the combustion of fossil fuels (PM_{10}, CO, NO_x, SO_2, and ROG) which can to some degree be mitigated.

Long term (indirect) air quality impacts from program operations could occur from changes in agricultural practices. An increase in water cost or changes in water availability could potentially change the types of crops grown. For example, crops such as wheat, corn, alfalfa, rice and cotton are common in the Central Valley and require heavy water use. Changes in the cost and the availability of water could potentially cause farmers to alter the types of crops they choose to grow and harvest. These changes could potentially impact various pollutant concentrations associated with emissions of fugitive dust from agricultural activities, exhaust emissions from farm equipment, toxic chemicals used in pesticides and herbicides, and emissions from crop burning. Potential air quality impacts are summarized below in Table 2.2-1.

Additional changes in agricultural practices and other land use could actually be beneficial. These beneficial impacts would be created by flooding of delta islands and land along river banks currently used for agriculture and other land uses. These actions could create net air quality benefits in localized areas when compared with current conditions or the no action option if farm land is taken out of production.

Additional indirect impacts which could occur due to certain aspects of the project are not addressed in detail due to the programmatic approach to this document. The most obvious of these indirect impacts could occur from an increase in power production necessary to operate new and/or expanded electric pumps and stations. Long term, indirect impacts from increased power production could potentially be significant in its entirety, however, emissions would most likely be distributed throughout California and potentially throughout the western states. It would be unlikely that these operations would create a measurable increase in concentrations of

TABLE 2.2-1
POTENTIAL AIR QUALITY IMPACTS

Impact	Source	Potential Significant Impact?
Adverse Impacts		
Construction Impacts		
Dust Emissions (PM_{10})	Construction Activities	YES
Temporary PM_{10}	Construction Equipment Exhaust	YES
Temporary NO_X	Construction Equipment Exhaust	YES
TemporarySO_X	Construction Equipment Exhaust	YES
Temporary ROG	Construction Equipment Exhaust	YES
Temporary CO	Construction Equipment Exhaust	YES
Operational/Direct Impacts		
Power Plant Operations	Increase Power Requirements for Pumping	NO
Changes in Agricultural Practices	Crop Changes due to Economics of Water Availability	YES
Beneficial Impacts		
Agricultural Land Conversion/Retirement	Flooded Agricultural Land	YES
Changes in Agricultural Practices	Crop Changes due to Economics of Water Availability	YES

criteria pollutants or toxic air contaminants. Additional impacts could occur due to an increase in urbanization. This could result from a number of the project programs and actions including the levee integrity program, the increase in water storage, and water conservation.

2.2 Summary Of Mitigation Measures

Mitigation measures discussed below would decrease the detrimental impacts from construction activities. Since there are no detrimental long-term impacts which differ from construction activities, no mitigation measures have been included for long-term effects.

2.2.1 Fugitive Dust Controls

Good construction practices to minimize fugitive dust from construction sites include general watering of exposed areas, the use of soil stabilizers and other dust suppressant measures on unpaved surfaces, daily sweeping of paved surfaces, limits on construction activities, and other measures as appropriate. Table 2-2.2 provides a more detailed list of basic and enhanced dust control measures at construction sites.

2.2.2 Construction Equipment Exhaust

The following measures may be employed to reduce potential construction vehicle exhaust emissions (BAAQMD 1996). The feasibility of some measures should be considered on a case-by-case basis:

* Maintain properly tuned equipment
* Minimize idling time (e.g. 10-minute maximum)
* Use alternative fueled combustion equipment
* Limit the hours of operation of heavy duty equipment and/or the amount of equipment

2.3 Summary Of Potential Significant Unavoidable Impacts

Subsequent to implementation of the mitigation activities discussed above in Section 2.2, significant impacts from combustion emissions from construction equipment could probably be decreased. However, the degree of these impacts would be dependent on the size and duration of specific projects.

Impacts from fugitive dust created by construction activities is a potential concern and periods of significant dust may be unavoidable. Mitigation measures described above could decrease dust emissions by approximately 50 % to 80%. Whether or not there are any significant impacts also depends on the location and size of a specific project. For example, Lake County is the only air basin described as part of the project that is in attainment, and meets the California Ambient Air Quality Standards for PM_{10} (See Affected Environment for description). Higher emissions would probably be tolerated in Lake County than other air basins within the project area. Any

TABLE 2.2-2

CONTROL MEASURES FOR PM10 EMISSIONS FROM CONSTRUCTION

Basic Control Measures
* Water all active construction areas at least twice daily
* Apply water or soil stabilizers (non-toxic) on all unpaved access roads, parking areas and staging areas.
* Sweep daily all paved access roads, parking areas and staging areas
* Sweep street daily if visibility soil materials is carried onto adjacent public streets
* Cover all trucks hauling soil and other loose materials or required all trucks to maintain at least two feet of freeboard.

Enhanced Control Measures
* Apply all "Basic" control measures
* Cover, hydroseed or apply soil stabilizers (non-toxic) to inactive construction areas
* Cover, enclose, water or apply soil stabilizers (non-toxic) to exposed stockpiles
* Limit traffic speeds on unpaved roads to 15 mph
* Install sandbags or other erosion control measures to prevent silt runoff to public roadways
* Replant vegetation in disturbed areas as quickly as possible
* Install wheel washers for all existing trucks, or wash off all trucks and equipment leaving the site
* Install wind breaks, or plant trees/vegetation wind breaks at windward side(s) of construction areas
* Limit the area subject to excavation, grading and other construction activity at any one time
* Suspend excavation and grading activity when winds exceed 25 mph.

emissions of PM_{10} in areas of non-attainment could create a localized significant impact. These same emissions may or may not cause an exceedance of the National Ambient Air Quality Standards (NAAQS). Sacramento and San Joaquin Valley Air Basins are in non-attainment for the PM_{10} standard and the San Francisco Bay Area Air Basin has attained the NAAQS. The rest of the air basins within the project area are not classified due to lack of data (see Affected Environment). Impacts would need to be analyzed on a localized level to determine potential specific impacts.

Long term proposed project impacts could be beneficial for some project actions. These would include those from the conversion of agricultural lands within the CALFED project area.

As discussed in Section 1.0, the project contains four common programs. These programs, combined with variations of the three Alternatives, include various combinations of potential conveyance programs and storage facilities. The impacts described above and discussed in more detail in the sections that follow have been summarized in Table 2.2-3 (except the SWP and CVP Service Area). The table summarizes both short term and long term impacts due to proposed project actions. Impacts are expressed as follows:

* "0" = no impacts,
* "-" = detrimental impacts,
* "+" = beneficial impacts, and
* "x" = varying impacts.

TABLE 2.2-3
SUMMARY OF IMPACTS

Region	Alternative 1			Alternative 2					Alternative 3								
	1a	1b	1c	1a	1b	1c	1d	1e	1a	1b	1c	1d	1e	1f	1g	1h	1i
Short Term Impacts																	
Delta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Francisco Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sacramento River Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Joaquin River Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LongTerm Impacts																	
Delta	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
San Francisco Bay	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sacramento River Region	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
San Joaquin River Region	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

3.0 ASSESSMENT METHODS

The majority of air quality impacts will be due to construction activities from the various programs and actions. Impacts from long term activities, such as changes in agricultural activities, could potentially be significant. The following sections describe the criteria for assessing air quality impacts which may occur due to project alternatives. Specific emissions associated with this project cannot be quantified, however, Section 5.0 identifies the potential impacts pursuant to the assessment methods described below.

3.1 Construction Emissions

The majority of impacts from the project will be due to construction and will be temporary. Direct potential emissions from construction would be PM_{10}, CO, ROG, SO_2 and NO_x. Construction-related emissions come from a variety of activities, including: (1) earth moving such as excavation, grading, road building, and levee construction; (2) travel by construction equipment, especially on unpaved surfaces; and (3) exhaust from construction equipment.

The assessment of construction-related impacts focuses on comparing the general magnitude of construction activities between alternatives. Relative magnitudes of differences in construction grading, levee construction, pipeline or aqueduct installation, or similar actions are summarized.

For example, earth moving activities and the use of construction equipment will generate PM_{10} emissions. The U.S. Environmental Protection Agency (EPA) has developed a generalized fugitive dust emission factor for these activities taken as a whole of 1.2 tons of total suspended particulate matter per acre per month of activity (EPA 1995). The California Air Resources Board (ARB) estimates that 64% of construction-related total suspended particulate emissions is PM_{10} (ARB 1991). These factors yield 0.77 tons of PM_{10} per acre per month, or 51 pounds per day for uncontrolled construction-related activities. These factors can provide a relative understanding of the magnitude of particulate emissions from construction activities. Because specific acreage, locations and additional information necessary to complete these calculations are too specific for this analysis, the focus is on whether construction activities will be necessary to fulfill the objectives of each alternative and the relative magnitude of these activities.

3.2 Long Term Emissions

Indirect or long-term emissions could occur from potential changes in agricultural activities, either by crop type changes or by decreasing the acreage of land available for agricultural activities. Changes in crop types can have various impacts, including changes in fugitive dust production, air emissions due to combustion from equipment operation, and crop burning. Potential changes in the type and amount of herbicides and pesticides applied could also result in increased impacts. Potential air quality benefits could also result from agricultural land retirement.

Changes in crop types may occur as a result of significant changes in water availability and/or the cost of water. The economics of farming certain crops could potentially initiate voluntary changes which could subsequently impact the air quality in a given region. For example, farmers that grow rice, alfalfa and other water intensive crops, may decide to grow crops that are less water intensive. It is possible that less water intensive crops could have dryer topsoil, contributing to an increase in fugitive dust emissions and ultimately, PM_{10} concentrations. Dust and equipment emissions, emissions from pesticides and herbicides, impacts from crop burning, etc., would need to be estimated from the crops currently grown and compared with potential emissions from expected future activities. For example, if current activities emit "A" emissions and potential future agriculture activities for that area emit "B" emission, the difference would define the impact. If "B" results in lower emissions than "A", then there would be a net air quality benefit. On the other hand, if emissions from "A" are lower than those from "B", there would be impacts resulting in air quality deterioration. Therefore, emissions from this type of impact could vary from detrimental to beneficial.

The retirement of agricultural land could potentially cause a decrease in fugitive dust, emissions from equipment exhaust, and toxic chemicals emitted through the use of herbicides and pesticides. This could result in a net air quality benefit. To estimate the degree of these benefits, the size of these lands must first be identified followed by the estimation of fugitive dust and other emissions created by specific agricultural activities. Subsequent to agricultural land retirement, the emissions would no longer be emitted into the atmosphere. Therefore, there could be a net air quality benefit due to agricultural land retirement.

4.0 SIGNIFICANCE CRITERIA

For the purposes of this programmatic document, emissions associated with land disturbing activities, water pumping or power generation will require compliance with federal and state standards and local air district rules and regulations. The following are the significant impact thresholds associated with this programmatic EIR/EIS.

* The potential to cause an exceedance or exacerbate an existing exceedance of a state or federal ambient air quality standard.
* The potential to cause an exceedance of an increment for air quality deterioration.
* The potential to significantly increase health risks due to emissions of toxic air contaminants.
* The potential to cause a public nuisance due to odors, dust, and a deterioration of visibility.

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5.0 ENVIRONMENTAL IMPACTS

5.1 Description of No-Action Resource Conditions

5.1.1 Delta Region - Resource Conditions

Mobile sources are the main contributors to the air quality problems in this region, mainly near the urbanized areas. As a result, CO, PM_{10} and ozone (O_3) are the main pollutants of concern. However, air quality has improved (pollutant levels have decreased) over the last 7 to 10 years due to regulatory constraints on emission-producing sources and continued improvements in vehicular emission controls. It is anticipated that the current trends would continue under the No Action alternative.

5.1.2 San Francisco Bay Region - Resource Conditions

No action air quality problems and future air quality trends are the same as those discussed for the affected environment for the San Francisco Bay Area, Section 3.4.

5.1.3 Sacramento River Region - Resource Conditions

No action air quality problems and future air quality trends are the same as those discussed for the affected environment for the Sacramento River Region, Section 3.4.

5.1.4 San Joaquin River Region - Resource Conditions

No action air quality problems and future air quality trends are the same as those discussed for the affected environment for the San Joaquin River Region, Section 3.4.

5.1.5 SWP and CVP Service Area - Resource Conditions

No action air quality problems and future air quality trends are the same as those discussed in the affected environment for the SWP and CVP Service Area, Section 3.4.

5.2 Description of Alternative Resource Conditions

5.2.1 Delta Region - Resource Conditions

The following sections discuss the potential air quality impacts for proposed project activities in the Delta Region. For the purposes of the air quality analysis, the discussion refers to the Air Basins within the Delta Region. The northern part of the Delta includes the Sacramento Valley Air Basin, the southern portion of the Delta includes the San Joaquin Valley Air Basin and the central, western portion of the Delta contains the eastern most portion of the Bay Area Air Quality Air Basin (See Figure 1-2).

Air quality emissions from the program actions, primarily construction activities, will vary considerably between alternatives, as well as between timing of the alternatives. The impacts, by alternative, are summarized below. Subsequent sections discuss the impacts in greater detail. Construction emissions have been discussed in a single section as they are similar for virtually all alternatives. The details available for quantification are too specific for this programmatic approach. Therefore, the discussion focuses on the relative impacts which could potentially occur due to construction activities, such as the construction of conveyance facilities and new or expanded storage facilities. Potential indirect and operational impacts from each of the alternatives are described in more detail and are broken down by the four common programs and individual action items for proposed Delta activities. For each alternative, the relative impacts are discussed for the four common programs and the various storage and conveyance actions. A matrix summarizing the action items to be included in each of the 17 variations of the three alternatives (CALFED 1997a) and relative potential post-mitigation construction impacts is presented in Figure 5-1. This figure also shows which actions could involve agricultural land conversion and the air basins affected. Table 5.2.1 summarizes potential impacts, by alternative, for each of the four common programs and for proposed storage and conveyance activities. The table rates the impacts as follows:

* "0" = no impacts,
* "-" = detrimental impacts,
* "+" = beneficial impacts, and
* "x" = varying impacts.

5.2.1.1 Summary of Regional Effects by Alternative

Summary of Potential Significant Impacts

Alternative 1. Significant air quality impacts associated with Alternative 1 within the Delta Region would be confined to construction emissions of fugitive dust and combustion emissions of PM_{10}, CO, NO_x, SO_2 and ROG. These emission would primarily be associated with levee construction activities associated with the Levee System Integrity and the Ecosystem Restoration Programs which are common to all alternatives. As shown in Figure 5-1, there are no construction activities from conveyance activities associated with Alternative 1A. However, Alternatives 1B and 1C include two small conveyance actions which would require some construction activities and create potentially significant, temporary impacts. Storage facilities included in Alternative 1C are not expected to impact the air quality in the Delta Region.

The Ecosystem Restoration Program and Levee System Integrity Program could retire up to 200,000 acres of existing agricultural land. The land retirement could potentially decrease emissions from agricultural activities of PM_{10} from land preparation, various pollutants from equipment operations, toxic air contaminants due to herbicides and pesticides, and crop burning. The decrease in these activities could create a net air quality benefit.

Alternative 2. Potentially significant impacts associated with Alternative 2 would be due to temporary, unavoidable emissions from construction activities. As described in Alternative 1, the common Levee System Integrity and Ecosystem Restoration Programs would contribute fugitive dust and combustion emissions of PM_{10}, CO, NO_x, SO_2 and ROG. Emissions associated with construction of conveyance actions for Alternatives 2A-2E could also potentially be significant. (see Figure 5-1). Storage facilities associated with Alternatives 2B,

TABLE 5.2-1

SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

ECOSYSTEM RESTORATION

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_X[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_X[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants.

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-1
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

WATER QUALITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-1
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

WATER USE EFFICIENCY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Long Term TAC[6] Agricultural Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-1
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

LEVEE INTEGRITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_x[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_x[2] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_x[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_x[3] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-1
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

STORAGE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	+	0	0	0	+	0	+	+	0	+	0	+
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-1
(concluded)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
DELTA REGION

CONVEYANCE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_x[2] Construction Equipment	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_x[2] Construction Equipment	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_x[3] Construction Equipment	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_x[3] Construction Equipment	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

FIGURE 5-1

BAY-DELTA PROGRAM ALTERNATIVES AND RELATIVE SHORT TERM AIR QUALITY IMPACTS

ACTION	AIR BASIN FOR ACTION AND/OR POTENTIAL IMPACTS	Potential for Land Conversion	ALTERNATIVE 1A	1B	1C	2A	2B	2C	2D	2E	3A	3B	3C	3D	3E	3F	3G	3H	3I
ECOSYSTEM RESTORATION PROGRAM	Northeast Plateau, Sacramento, Lake County, Mountain Counties, San Joaquin Valley, Great Basin	YES	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WATER QUALITY PROGRAM	Sacramento, San Joaquin Valley	NO	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WATER USE EFFICIENCY PROGRAM	Northeast Plateau, Sacramento, Lake County, Mountain Counties, San Joaquin Valley, Great Basin	NO	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
LEVEE SYSTEM INTEGRITY PROGRAM	Sacramento, San Joaquin Valley	YES	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CONVEYANCE FACILITIES																			
Changes in Delta Operations	Sacramento, San Joaquin	NO	▒	▒	▒														
CVP-SWP Improvements	San Joaquin	NO		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
South Delta Modifications	San Joaquin	NO		■	■	■	■	■			■	■	■	■	■	■	■		
North Delta Channel Modifications	Sacramento	YES				■	■				■	■	■	■	■	■	■		■
10,000 cfs Screened Hood Intake	San Joaquin	YES				■	■		■										
Western 15,000 cfs, Northern 15,000 cfs, Eastern 15,000 cfs Isolated South Delta Intake	San Joaquin	YES						■											■
Mokelumne River Floodway (East) and East Delta Wetlands Habitat	Sacramento	YES							■										
South Delta Habitat Modifications	San Joaquin	YES							■	■								■	
Central Delta Aquatic Habitat and Setback Levee	Sacramento	YES								■								■	
Mokelumne River Floodway (West) and East Delta Wetlands Habitat	Sacramento	YES								■								■	
5,000 cfs Channel Isolated Facility (Open Channel)	Sacramento, San Joaquin	YES									■	■						■	
Isolated Facility - 5,000 cfs Buried Pipeline	Sacramento, San Joaquin	YES											■	■					
15,000 cfs Open Channel Isolated Facility (Open Channel)	Sacramento, San Joaquin	YES													■				
Chain of Lakes with 10,000 cfs Intake plus 5,000 cfs Distributed Pumps	Sacramento, San Joaquin	YES														■			
5,000 cfs Screened Deep Water Ship Channel and West Delta Tunnel	Sacramento, San Joaquin	YES															■		
NEW OR EXPANDED STORAGE FACILITIES																			
3.0 MAF Upstream Storage (Sac River Tributaries)	Northeast Plateau, Sacramento, Lake County, Mountain Counties [1]	----			■		■			■		■		■	■	■	■	■	■
500 TAF Storage (San Joaquin River Tribributaries)	San Joaquin Valley, Great Basin [1]	----					■			■		■		■	■	■	■	■	■
500 TAF Ground Water Storage (Sacramento)	Sacramento[1]	----			▒		▒			▒		▒		▒	▒	▒	▒	▒	▒
500 TAF Ground Water Storage (San Joaquin)	San Joaquin [1]	----			▒		▒			▒		▒		▒	▒	▒	▒	▒	▒
1.0 MAF Aqueduct Storage	Sacramento, San Joaquin [1]	----			■														
2.0 MAF Off Aqueduct Storage/South of Delta	San Joaquin [1]	----					■		■	■		■		■	■	■	■	■	■
200 TAF In-Delta Storage	Sacramento, San Joaquin [1]	----										■		■	■		■		
50 - 100 TAF In-Delta Storage	Sacramento, San Joaquin [1]	----						■											■

[1] Locations not specified.

▒ NO CONSCRUCTION ACTIVITIES; ACTION IS PART OF THE SPECIFIED ALTERNATIVE.

■ CONSTRUCTION ACTIVITIES AND HAS POTENTIAL FOR AIR QUALITY IMPACTS.

2C, 2D and 2E could create some impacts due to construction activities. There also may be some beneficial impacts due to flooding of various lands.

Land retirement due to the common Levee System Integrity Program and Ecosystem Restoration Programs could create potential net air quality benefits as described above. Additional retirement of agricultural land from various conveyance activities for Alternatives 2A through 2E (described below) could add to these potential air quality benefits (See Figure 5-1).

Alternative 3. Potentially significant impacts associated with Alternative 3 would be due to temporary, unavoidable emissions from construction activities. As described in Alternative 1, the common Levee System Integrity and Ecosystem Restoration Programs would contribute fugitive dust and combustion emissions of PM_{10}, CO, NO_x, SO_2 and ROG. Construction emissions creating potentially significant impacts would also be associated with various conveyance actions proposed for Alternatives 3A through 3I (see Figure 5-1). Storage facilities associated with Alternatives 3B, 3D-3I could create some impacts due to construction activities. There also may be some beneficial impacts due to flooding of various lands

Land retirement due to the common Levee System Integrity Program and Ecosystem Restoration Programs could create potential net air quality benefits as described above. Additional retirement of agricultural land from various conveyance activities for Alternatives 3A through 3I (described below) would add to these potential air quality benefits (see Figure 5-1).

Summary of Mitigation Strategies

Mitigation measures are discussed in Section 2.2.

Summary of Potential Significant Unavoidable Impacts

Alternative 1. Significant air quality impacts associated with Alternative 1 after mitigation within the Delta Region would probably be confined to construction emissions of fugitive dust. Depending on the magnitude and duration of the specific project action, impacts from equipment exhaust could also be locally significant. These emissions would primarily be due to levee construction activities associated with the Levee System Integrity and the Ecosystem Restoration Programs which are common to all alternatives. Small conveyance activities associated with Alternatives 1B and 1C would also contribute to PM_{10} emissions from fugitive dust. Air quality benefits associated with agricultural land retirement could also occur.

Alternative 2. Potentially significant impacts associated with Alternative 2 would be due to temporary, unavoidable emissions from construction activities. As described in Alternative 1, the common Levee System Integrity and Ecosystem Restoration Programs would create impacts of PM_{10} due to emissions of fugitive dust. Construction emissions creating potentially significant impacts would also be associated with various conveyance actions and storage facilities proposed for Alternatives 2A through 2E (see Figure 5-1). Air quality benefits associated with agricultural land retirement could also occur.

Alternative 3. Potentially significant impacts associated with Alternative 3 would be due to temporary, unavoidable emissions from construction activities. As described in Alternative 1, the common Levee System Integrity and Ecosystem Restoration Programs would contribute fugitive dust, creating concentrations of PM_{10} resulting in unavoidable, temporary significant impacts. Construction emissions creating potentially significant impacts could also be associated with various conveyance actions and storage facilities proposed for Alternatives 3A through 3I (see Figure 5-1). Air quality benefits associated with agricultural land retirement could also occur.

5.2.1.2 Impacts of Action Alternatives

Direct and Construction Impacts

Construction activities from three of the four common programs (Water Use Efficiency Program has no construction) and various actions would cause the types of impacts that are discussed here unless other wise specified below. Constructing any of the proposed actions will generate construction-related emissions. For example, many of these programs may include the removal of tailings piles and contaminated soils at abandoned mines, and/or the construction of setback levees and open trench work. These types of activities create PM_{10} emissions from earth moving activities and construction vehicle travel, and emissions of PM_{10}, CO, ROG, NO, and SO_2 from the combustion of fossil fuels in construction equipment. Additional construction activities include, but are not limited to, the installation of new pumps, parking areas, and various structures, and the relocation of roads, utilities, resorts and residences. Construction emissions could potentially be significant in the vicinity of the project when compared to the no action alternative. However, if the appropriate mitigation measures, discussed in Section 2.2, are applied, air quality impacts could be reduced, in some cases below significance levels.

Indirect and Operational Impacts

Alternative 1

Ecosystem Restoration Program. This program will retire approximately 100,000 to 150,000 acres of existing agricultural land in the Delta Region (CALFED 1997b). Long term (indirect) impacts from this program would be minimal and probably beneficial. These would include a decrease in emissions from preparation of agricultural land, burning fossil fuels, and applying herbicides and pesticides from the retirement of agricultural lands. Impacts from this program could effect air quality in both the Sacramento and San Joaquin Valley Air Basins.

Water Quality Program. The only activities that create air emissions are those related to construction activities (as described above). These construction activities would occur in the Sacramento and San Joaquin Valley Air Basins (CALFED 1997c). There will be no significant long term indirect or operational impacts associated with this program.

Water Use Efficiency Program. There would be no construction associated with this program (CALFED 1997d) and therefore, no construction impacts. Potential indirect and/or long term impacts from changes in agricultural activities could occur depending on the type and extent of changes due to water availability and cost. These impacts could be either detrimental or beneficial depending on specific changes (see Section 3.2). These activities could impact both the Sacramento and San Joaquin Valley Air Basins.

Levee System Integrity Program. The levee system would involve the flooding of between 30,000 and 60,000 acres of agricultural land (CALFED 1997e). The greatest air quality impacts from current agricultural activities are PM_{10} emissions from tilling, wind blown dust, agricultural burning, and farm equipment operations. Other air emissions from agricultural activities include NO, CO, SO_2, and ROG from farm equipment and various herbicides and pesticides. After implementation of this action is complete, the decrease in emissions from the retired agricultural land could be proportional to the total agricultural land taken out of production. Local air quality in portions of the Sacramento and San Joaquin Valley Air Basins during certain times of the year could see potential benefits.

Storage Facilities. There are no storage facilities proposed in the Delta Region for Alternative 1. Therefore, there will be no air quality impacts.

Conveyance Facilities.

Changes in Delta Operations. There will be no new structures (CALFED 1997f) and therefore, no construction emissions associated with this action. With continued operation, air quality trends in the Sacramento and San Joaquin Valley Air Basins would remain the same.

Central Valley Project - State Water Project (CVP-SWP) Improvements. The pumping plant would require electricity to operate and could create indirect emissions due to the burning of fossil fuels at power plants. However, these emissions should be minimal and should not create significant impacts due to increased power production.

South Delta Modifications. This action will produce no long term impacts on air quality. Air quality trends in the Sacramento and San Joaquin Valley Air Basins would remain consistent.

Alternative 2

Ecosystem Restoration. Impacts from this program will be the same as those discussed for Alternative 1.

Water Quality Program. Impacts from this program will be the same as those discussed for Alternative 1.

Water Use Efficiency Program. Impacts from this program will be the same as those discussed for Alternative 1.

Levee System Integrity Program. Impacts from this program will be the same as those discussed for Alternative 1.

Storage Facilities. No long term air emissions are expected from the proposed storage facilities in the Delta Region. There is the possibility of a localized net air quality benefits due to flooded lands.

Conveyance Facilities.

Central Valley Project-State Water Project (CVP-SWP) Improvements. Impacts from this action are the same as those discussed in the CVP-SWP discussion for Alternative 1.

South Delta Modifications. Impacts from this action are the same as those discussed in the South Delta Modifications discussion for Alternative 1.

North Delta Channel Modifications. This action will decrease land used for agriculture by approximately 3,500 to 4,000 acres (CH2M HILL 1997). The greatest air quality impacts from current agricultural activities are PM_{10} emissions from tilling, wind blown dust, agricultural burning, and farm equipment operations. Other air emissions from agricultural activities include NO, CO, SO_2, and ROG from farm equipment and various herbicides and pesticides. After implementation of this action is complete, the decrease in emissions from the retired agricultural land would be proportional to the total agricultural land within the Delta Region. Local air quality during certain times of the year could have some potential benefits. However, this action only decreases agricultural activities by a relatively small amount in the North Delta and would not change the air quality trends within the Sacramento Valley Air Basin. The air quality in the Sacramento Valley Basin could remain consistent.

10,000 cfs Screened Hood Intake. This action would reduce the amount of land used for agriculture by approximately 800 to 1000 acres (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with a decrease in the degree of benefits proportional to the amount of agricultural land retired and/or flooded. Air quality impacts from this action could affect the Sacramento Valley Air Basin.

Western 15,000 cfs, Northern 15,000 cfs, and the Eastern 15,000 cfs Delta Intakes and Conveyance. These three actions have been combined because they would only be accomplished in conjunction with each other. These actions involve the conversion of and retirement of approximately 5,000 to 10,000 acres of agricultural land in the southern Delta for conveyance (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements Action with a change in the degree of benefits proportional to the amount of agricultural land retired and/or flooded and the location. Impacts from this action could affect the air quality in the San Joaquin Valley Air Basin.

Mokelumne River Floodway (East) and East Delta Wetlands Habitat. This action would provide channel modifications in the northern delta and include the flooding of several islands (CALFED 1997f) comprising approximately 15,000 to 20,000 acres of agricultural land (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with a increase in the degree of benefits proportional to the amount of agricultural land retired and/or flooded, and location. Impacts from this action could affect air quality in the Sacramento Valley Air Basin.

South Delta Habitat Modifications. This action involves the conversion of approximately 10,000 to 15,000 acres of agricultural land in the southern Delta (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with changes in degree of benefits proportional to the amount of agricultural land retired and/or flooded, and location.

Impacts from this action could affect air quality in the San Joaquin Valley Air Basin.

Central Delta Aquatic Habitat and Setback Channel. This action involves the conversion of approximately 7,000 to 10,000 acres of agricultural land in the northern Delta (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with a change in the degree of benefits proportional to the amount of agricultural land retired and/or flooded and location. This action could affect the air quality in the Sacramento Valley Air Basin.

Mokelumne River Floodway (West) and East Delta Wetlands Habitat. This action is similar to Mokelumne River Floodway (East) Action except for some decreases in construction activities and less agricultural land retired. The types of impacts from this action are the same as those discussed for the North Delta Improvements with a change in the degree of benefits proportional to the amount of agricultural land retired and/or flooded, and the location. Impacts from this action could affect the air quality in the Sacramento Valley Air Basin.

Alternative 3

Ecosystem Restoration. Impacts from this program will be the same as those discussed for Alternative 1.

Water Quality Program. Impacts from this program will be the same as those discussed for Alternative 1.

Water Use Efficiency Program. Impacts from this program will be the same as those discussed for Alternative 1.

Levee System Integrity Program. Impacts from this program will be the same as those discussed for Alternative 1.

Storage Facilities. Impacts from this program will be the same as those discussed for Alternative 2.

Conveyance Facilities.

Central Valley Project-State Water Project (CVP-SWP) Improvements. Impacts from this action are the same as those discussed in the CVP-SWP discussion for Alternative 1.

South Delta Modifications. Impacts from this action are the same as those discussed in the South Delta Modifications discussion for Alternative 1.

North Delta Channel Modifications. Impacts from this action are the same as those discussed in the North Delta Channel Modifications discussion for Alternative 2.

Western 15,000 cfs, Northern 15,000 cfs, Eastern 15,000 cfs Isolated South Delta Intake. Impacts from this action are the same as those discussed in the Western 15,000 cfs, Northern 15,000 cfs, Eastern 15,000 cfs Isolated South Delta Intake discussion for Alternative 2.

South Delta Habitat Modifications. Impacts from this action are the same as those discussed in the South Delta Habitat Modifications discussion for Alternative 2.

Central Delta Aquatic Habitat and Setback Levee. Impacts from this action are the same as those discussed in the Central Delta Aquatic Habitat and Setback Levee discussion for Alternative 2.

Mokelumne River Floodway (West) and East Delta Wetlands Habitat. Impacts from this action are the same as those discussed in the Mokelumne River Floodway (West) and East Delta Wetlands Habitat discussion for Alternative 2.

5,000 cfs Channel Isolated Facility (Open Channel). The isolated facility would require a corridor or right-of-way of approximately 5,000 acres of primarily agricultural land (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with changes in degree proportional to the amount of agricultural land retired and/or flooded, and the location. This action would potentially affect the air quality in both the Sacramento and San Joaquin Valley Air Basins.

Isolated Facility - 5,000 cfs Buried Pipeline. This action is similar to the 5,000 cfs open channel, except it would be a pipeline. The types of impacts from this action are the same as those discussed for the North Delta Improvements with changes in degree proportional to the amount of agricultural land retired and/or flooded, and the location. This action would potentially affect the air quality in both the Sacramento and San Joaquin Valley Air Basins.

15,000 cfs Open Channel Isolated Facility (Open Channel). This action is virtually the same as the 5,000 cfs Channel Isolated Facility (Open Channel) with a greater volume of conveyance. The types of impacts from this action are the same as those discussed for the North Delta Improvements with changes in degree proportional to the amount of agricultural land retired and/or flooded, and the location. This action would potentially affect the air quality in both the Sacramento and San Joaquin Valley Air Basins.

Chain of Lakes with 10,000 cfs Intake plus 5,000 cfs Distributed Pumps. This action will flood approximately 32,000 to 35,000 acres of agricultural land (CH2M HILL 1997). The types of impacts from this action are the same as those discussed for the North Delta Improvements with changes in degree proportional to the amount of agricultural land retired and/or flooded, and the location. This action would potentially affect the air quality in both in the Sacramento and San Joaquin Valley Air Basins.

5,000 cfs Screened Deep Water Ship Channel and West Delta Tunnel. Construction would affect the air quality in the San Francisco Bay Area air basin within the Delta Region. No long term air emissions are expected from this action.

5.2.2 San Francisco Bay Region - Resource Conditions

The following sections discuss the potential air quality impacts for proposed project activities in the San Francisco Bay Region. Only one air basin is located in this region, the San Francisco Bay Area Air Basin (See Figure 1-2).

Impacts to the San Francisco Bay Area Air Basin will be far less than those in the Sacramento and San Joaquin Valley Air Basins. This is because there is far less construction proposed within the basin. The impacts, by alternative, are summarized below. Subsequent sections discuss the impacts in greater detail. Construction emissions have been discussed in a single section as they are similar for virtually all alternatives. The details available for quantification are too specific for this programmatic approach. Therefore, the discussion focuses on the relative impacts which could potentially occur due to construction activities. Potential indirect and operational impacts from each of the alternatives are described in more detail and are broken down by the four common programs and individual action items for proposed Bay Region activities. For each alternative, the relative impacts are discussed for the four common programs and the various storage and conveyance actions. For programs and/or actions which have impacts similar to those discussed in Section 5.2, the reader is referred to those sections. Figure 5-1 lists the air basins where potential post mitigation construction impacts could occur. This figure also helps illustrate the degree of construction impacts from each alternative and lists the air basin(s) each might impact. The potential for land conversion is also included. Table 5.2.2 summarizes potential impacts, by alternative, for each of the four common programs and for storage and conveyance activities. The table rates the impacts as described in Section 5.2.1 (Delta Region).

5.2.2.1 Summary of Regional Effects by Alternative

Summary of Potential Significant Effects

Alternative 1. Potential significant impacts within the Bay Region from implementation of Alternative 1 would be primarily due to construction activities. The impacts would be due to emissions of fugitive dust (PM_{10}) due to construction activities or from emissions of PM_{10}, NO, SO_2, CO and ROG from construction equipment. Virtually all emissions in the Bay Region would be from the levee construction activities related to the Ecosystem Restoration Program. These emissions could potentially impact the air quality in only the eastern portion of the Bay Region.

The Ecosystem Restoration Program could retire up to 24,000 acres of existing agricultural land within the Bay Region (CH2M HILL 1997). The land retirement could potentially decrease emissions from agricultural activities from tilling, operation of equipment which combust fossil fuels, toxic air contaminants due the use of herbicides and pesticides, and crop burning. The decrease in these activities could create a net air quality benefit.

Alternative 2. Potential significant impacts from Alternative 2 are the same as those discussed for Alternative 1.

Alternative 3. Potential significant impacts from Alternative 3 are the same as those discussed for Alternative 1.

Summary of Mitigation Strategies

Mitigation measures are the same as those discussed in Section 2.2.

Summary of Potential Significant Unavoidable Impacts

Alternative 1. Potential significant, unavoidable air quality impacts associated with Alternative 1 after mitigation would probable be confined to construction emissions of fugitive dust. Depending on the magnitude and duration of the specific project action, impacts from equipment exhaust could also be locally significant. These emissions would primarily be associated with the levee construction activities due to the Ecosystem Restoration

TABLE 5.2-2

SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

ECOSYSTEM RESTORATION

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_x[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_x[2] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_x[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_x[3] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-2
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

WATER QUALITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 Particulate matter less than 10 micro meters in diameter.
2 Nitrogen oxides.
3 Sulfure oxides.
4 Reactive organic gases.
5 Carbon monoxide.
6 Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-2
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

WATER USE EFFICIENCY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Long Term TAC[6] Agricultural Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants.

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-2
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

LEVEE INTEGRITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-2
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

STORAGE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-2
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN FRANCISCO BAY REGION

STORAGE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

Programs. Impacts from other programs would be minimal and would be similar to those discussed for the Delta Region. However, they would be proportionately less because the Bay Region would have much less construction associated with it.

Alternative 2. Potential significant, unavoidable, impacts from Alternative 2 are the same as those discussed for Alternative 1.

Alternative 3. Potential significant, unavoidable, impacts from Alternative 3 are the same as those discussed for Alternative 1.

5.2.2.2 Impacts of the Action Alternatives

Construction Impacts

The type of impacts due to construction would be similar to those discussed above in the Delta Region discussion. Please refer to Section 5.2.1.2.

Indirect and Operational Impacts

Alternative 1

Ecosystem Restoration Program. This program would retire approximately 8,500 to 24,000 acres of existing agricultural land and several miles of river bank and adjoining land use in the Bay Region. Potential long term impacts associated with this program would similar to those discussed for the Delta Region.

Water Quality Program. It is assumed there would be no construction activities performed within the Bay Area Air Basin. Therefore, there will be no air quality impacts.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Not applicable.

Conveyance Facilities. Not applicable.

Alternative 2

Ecosystem Restoration Program. The impacts from this program would be the same as discussed for Alternative 1.

Water Quality Program. The impacts from this program would be the same as discussed for Alternative 1.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Not applicable.

Conveyance Facilities. Not applicable.

Alternative 3

Ecosystem Restoration Program. Impacts from this program would be the same as described in Alternative 1.

Water Quality Program. The impacts from this program would be the same as discussed for Alternative 1.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Not applicable.

Conveyance Facilities. Not applicable.

5.2.3 Sacramento River Region - Resource Conditions

The following sections discuss the potential air quality impacts for proposed project activities in the Sacramento Region. The Sacramento River Region primarily contains the Sacramento Air Basin (See Figure 1-2) and discussions in this section refer to impacts in terms of air basins.

Air quality emissions from the program actions, primarily construction activities, will vary slightly, depending upon the storage facilities chosen. The impacts, by alternative, are summarized below. Subsequent sections discuss the impacts in greater detail. Construction emissions are similar to those discussed for the Delta Region, and the reader is referred to that section for descriptions. The details available for quantification are too specific to this programmatic approach. Therefore, the discussion focuses on the relative impacts which could potentially occur due to construction activities, such as levees. Potential indirect and operational impacts from each of the alternatives are described in more detail and are broken down by the four common programs and individual action items for proposed activities. For programs and/or actions which have impacts similar to those previously discussed, the reader is referred back to those sections. The majority of impacts in the Sacramento Region would be from the Ecosystem Restoration Program. There are no conveyance activities within the Sacramento Region and therefore, no impacts. Figure 5-1 illustrates the degree of construction impacts from each alternative and lists the air basin(s) each might impact. The potential land conversion is also included. Table 5.2-3 summarizes potential impacts, by alternative, for each of the four common programs and for proposed conveyance and storage activities. The table rates the impacts as described in Section 5.2.1 (Delta Region).

5.2.3.1 Summary of Regional Effects by Alternative

Summary of Potential Significant Effects

Alternative 1. Potential significant impacts within the Sacramento Region from implementation of Alternative 1 would be primarily due to construction activities. The impacts would be associated with emissions of fugitive dust (PM_{10}) due to construction activities or from emissions of PM_{10}, NO, SO_2, CO and ROG due to the combustion of fossil fuels from construction equipment. Virtually all emissions in the Sacramento Region would be from the levee construction activities related to the Ecosystem Restoration Program which is part of all alternatives. Some of these impacts will be temporary, however, part of this program within this region involves the annual replacement of up to 161,000 tons of gravel along the river bank (CH2M HILL 1997). Storage facilities associated with Alternative 1C could create some localized

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TABLE 5.2-3

SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE SACRAMENTO RIVER REGION

ECOSYSTEM RESTORATION

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_X[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_X[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-3
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SACRAMENTO RIVER REGION

WATER QUALITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-3
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SACRAMENTO RIVER REGION

WATER USE EFFICIENCY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_X[2] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_X[3] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Long Term TAC[6] Agricultural Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-3
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SACRAMENTO RIVER REGION

LEVEE INTEGRITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-3
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SACRAMENTO RIVER REGION

STORAGE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	-	0	-	0	0	-	0	-	0	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-3
(concluded)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SACRAMENTO RIVER REGION

CONVEYANCE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

air quality impacts due to construction activities.

The Ecosystem Restoration Program could retire up to 78,000 acres (CH2M HILL 1997) of existing agricultural land within the Sacramento River Region. The land retirement could potentially decrease emissions from agricultural activities from tilling, operation of equipment which combust fossil fuels, toxic air contaminants due the use of herbicides and pesticides, and crop burning. The decrease in these activities could create a net air quality benefit.

Alternative 2. Potential significant impacts from Alternative 2 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen (Figure 5-1).

Alternative 3. Potential significant impacts from Alternative 3 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen (Figure 5-1).

Summary of Mitigation Strategies

Mitigation measures are the same as those discussed in Section 2.2.

Summary of Potential Significant Unavoidable Impacts

Alternative 1. Potentially significant, unavoidable air quality impacts associated with Alternative 1 after mitigation would probably be confined to construction emissions of fugitive dust. Depending on the magnitude and duration of the specific project actions, impacts from equipment exhaust could be locally significant. These emissions would primarily be associated with the levee construction activities due to the Ecosystem Restoration Programs and the gravel replacement activities, and possible construction of storage facilities. Impacts from other programs would be similar to those discussed for the Delta Region. However, they would be different in degree because of the differences in the amount of construction.

Alternative 2. Potentially significant impacts from Alternative 2 are the same as those discussed for Alternative 1.

Alternative 3. Potentially significant impacts from Alternative 2 are the same as those discussed for Alternative 1.

5.2.3.2 Impacts of the Action Alternatives

Construction Impacts

The type of impacts due to construction would be similar to those discussed above in the Delta Region discussion. Please refer to Section 5.2.1.2.

Indirect and Operational Impacts

Alternative 1

Ecosystem Restoration Program. This program will involve the construction of setback levees and the replacement of 96,000 to 161,000 tons of gravel annually along banks. Additionally, approximately 25,000 to 78,000 acres of existing agricultural land (CH2M HILL 1997) and miles of stream banks and adjoining land use in the Sacramento Region will be converted or retired.

Construction impacts of setback levees and the annual replacement of gravel would create emissions and impacts similar to those discussed for the Delta Region (Section 5.2.1.2). However, the impacts from gravel replacement could be ongoing and should be considered as a long term operational impact, not temporary as construction type emissions. Additional long term impacts from this program would probably be beneficial. These would include a decrease in emissions from tilling of agricultural land, emissions due to the burning of fossil fuels, and applying herbicides and pesticides from the retirement of agricultural lands.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Actual storage facilities have yet to be determined. However, the types of facilities include raising existing dams, construction new dams, developing off stream storage and the development of new on-stream storage.

Air quality impacts due to construction activities would be similar to those discussed above in Section 5.2.1.2. Indirect impacts due to increased water storage would have no direct air quality impacts.

Conveyance Facilities. Not applicable.

Alternative 2

Ecosystem Restoration Program. The impacts from this program would be the same as those discussed for Alternative 1.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. .Impacts from storage facilities would be the same as Alternative 1.

Conveyance Facilities. Not applicable.

Alternative 3

Ecosystem Restoration Program. Impacts from this program would be the same as described in Alternative 1.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Impacts from storage facilities would be the same as for Alternative 1.

Conveyance Facilities. Not applicable.

5.2.4 San Joaquin River Basin - Resource Conditions

The following sections discuss the potential air quality impacts for proposed project activities in the San Joaquin River Region. The San Joaquin River Region primarily contains the San Joaquin Valley Air Basin (See Figure 1-2) and discussion in this section refers to impacts in terms of air basins.

Air quality emissions from the program actions, primarily construction activities, will vary somewhat between alternatives, mainly due to the eventual storage facility options chosen for each alternatives. Impacts from each of the alternatives are virtually the same except for the differences in potential storage facilities. The impacts, by alternative, are summarized below. Subsequent sections discuss the impacts in greater detail. Construction emissions are similar to those discussed for the Delta Region, and the reader is referred to that section for descriptions. The details available for quantification are too specific to this programmatic approach. Therefore, the discussion focuses on the relative impacts which could potentially occur due to construction activities, such as levees. Potential indirect and operational impacts from each of the alternatives are described in more detail and are broken down by the four common programs and individual action items for proposed activities. For programs and/or actions which have impacts similar to those previously discussed, the reader will be referred back to those sections. The majority of impacts in the San Joaquin Valley Region would be from the Ecosystem Restoration Program. There are no conveyance activities within the San Joaquin Region and therefore, no impacts. Figure 5-1 illustrate the degree of impacts from each alternative and lists the air basin(s) each might impact. The potential for land conversion is also included. Table 5.2-4 summarizes potential impacts by alternative for each of the four common programs and for conveyance and storage activities. The table rates the impacts as described in Section 5.2.1 (Delta Region).

5.2.4.1 Summary of Regional Effects by Alternative

Summary of Potential Significant Effects

Alternative 1. Potential significant impacts within the San Joaquin Region from implementation of Alternative 1 would be primarily due to construction activities. The impacts could be associated with emissions of fugitive dust (PM_{10}) due to construction activities or from emissions of PM_{10}, NO, SO_2, CO and ROG from construction equipment. Virtually all emissions in the San Joaquin Region would be from the levee construction activities related to the Ecosystem Restoration Program included in all alternatives. Some of these impacts will be temporary, however, part of this program involves the annual replacement of up to 25,000 tons of gravel along the river bank, annually (CH2M HILL 1997).

The Ecosystem Restoration Program will retire up to 100,000 acres of existing agricultural land (CH2M HILL 1997) within the San Joaquin Region. The land retirement could potentially decrease emissions from agricultural activities from tilling, operation of equipment which combust fossil fuels, toxic air contaminants due the use of herbicides and pesticides, and

TABLE 5.2-4

SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

ECOSYSTEM RESTORATION

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary NO_x[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_x[2] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary SO_x[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_x[3] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Long Term TAC[6] Agricultural Activities	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-4
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

WATER QUALITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

C-001871

TABLE 5.2-4
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

WATER USE EFFICIENCY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Long Term TAC[6] Agricultural Activities	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants.

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

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TABLE 5.2-4
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

LEVEE INTEGRITY PROGRAM

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-4
(continued)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

STORAGE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_X[2] Construction Equipment	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term NO_X[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_X[3] Construction Equipment	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term SO_X[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	-	0	-	-	0	-	0	-	-	-	-	-	-
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
\- = detrimental impact
\+ = beneficial impact
x = impacts could vary; see Section 5.2.2

TABLE 5.2-4
(concluded)
SUMMARY OF POTENTIAL IMPACTS COMPARED TO THE NO ACTION ALTERNATIVE
SAN JOAQUIN RIVER REGION

CONVEYANCE FACILITIES

EMISSIONS	Alternative 1			Alternative 2					Alternative 3								
	A	B	C	A	B	C	D	E	A	B	C	D	E	F	G	H	I
Temporary Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Dust (PM_{10})[1] Construction Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term PM_{10}[1] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term NO_x[2] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term SO_x[3] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term ROG[4] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term CO[5] Construction Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Term TAC[6] Agricultural Activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Particulate matter less than 10 micro meters in diameter.
[2] Nitrogen oxides.
[3] Sulfure oxides.
[4] Reactive organic gases.
[5] Carbon monoxide.
[6] Toxic air contaminants

0 = no impact
- = detrimental impact
+ = beneficial impact
x = impacts could vary; see Section 5.2.2

the crop burning. The decrease in these activities could create a net air quality benefit.

Alternative 2. Potentially significant impacts from Alternative 2 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen (Figure 5-1).

Alternative 3. Potential significant impacts from Alternative 3 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen (Figure 5-1).

Summary of Mitigation Strategies

Mitigation measures are the same as those discussed in Section 2.2.

Summary of Potential Significant Unavoidable Impacts

Alternative 1. Potentially significant, unavoidable air quality impacts associated with Alternative 1 after mitigation would probably be confined to construction emissions of fugitive dust. Depending on the magnitude and duration of specific project actions, impacts from equipment exhaust could be locally significant. These emissions would primarily be associated with the levee construction activities, gravel replacement from the Ecosystem Restoration Program and construction of storage facilities. Impacts from other programs would be similar to those discussed for the Delta Region. However, they would be different in degree because of the differences in the amount of construction associated with it.

Alternative 2. Potential significant impacts from Alternative 2 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen.

Alternative 3. Potentially significant impacts from Alternative 3 are the same as those discussed for Alternative 1 with some differences depending on what storage facilities are chosen.

5.2.4.2 Impacts of the Action Alternatives

Construction Impacts

The type of impacts due to construction would be the same as those discussed above in the Delta Region discussion. Please refer to Section 5.2.1.2.

Indirect and Operational Impacts

Alternative 1

Ecosystem Restoration Program. This program will involve the construction of setback levees and the replacement of 12,000 to 25,000 tons of gravel annually along banks. Additionally, approximately 80,000 to 100,000 acres of existing agricultural land (CH2M HILL 1997) and miles of stream banks and adjoining land use in the Sacramento Region will be converted or retired.

Construction impacts of setback levees and the annual replacement of gravel would create emissions and impacts similar to those discussed for the Sacramento Region.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. The facilities proposed for this alternative include an increase in ground water storage. No long term impacts are expected from the operational activities.

Conveyance Facilities. Not applicable.

Alternative 2

Ecosystem Restoration Program. The impacts from this program would be the same as those discussed for Alternative 1.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Actual storage facilities have yet to be determined however, the types of facilities include raising existing dams, developing off stream storage and the development of new on-stream storage.

Air quality impacts due to these activities would be due to construction activities and would be similar to those discussed above in Section 5.2.1.2. No long term impacts are expected from the operational activities.

Conveyance Facilities. Not applicable.

Alternative 3

Ecosystem Restoration Program. Impacts from this program would be the same as described in Alternative 1.

Water Quality Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Water Use Efficiency Program. Impacts from this program on air quality would be similar to those described for the Delta Region.

Levee System Integrity Program. Not applicable.

Storage Facilities. Impacts from this program would be the same as described in Alternative 2.

Conveyance Facilities. Not applicable.

5.2.5 SWP and CVP Service Area - Resource Conditions

The SWP-CVP region outside the Central Valley will include the installation of no new pumping facilities, storage facilities, or other project-related facilities. Because there are no new facilities, there will be no construction activities creating fugitive dust emissions or other construction-related emissions. No direct activities associated with the four common programs, the proposed storage facilities, or conveyance facilities will be located within this region. Therefore, there will be no air quality impacts associated with the proposed project in this SWP-CVP region.

6.0 REFERENCES

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